ATWATER KENT RADIO

ATWATER KENT

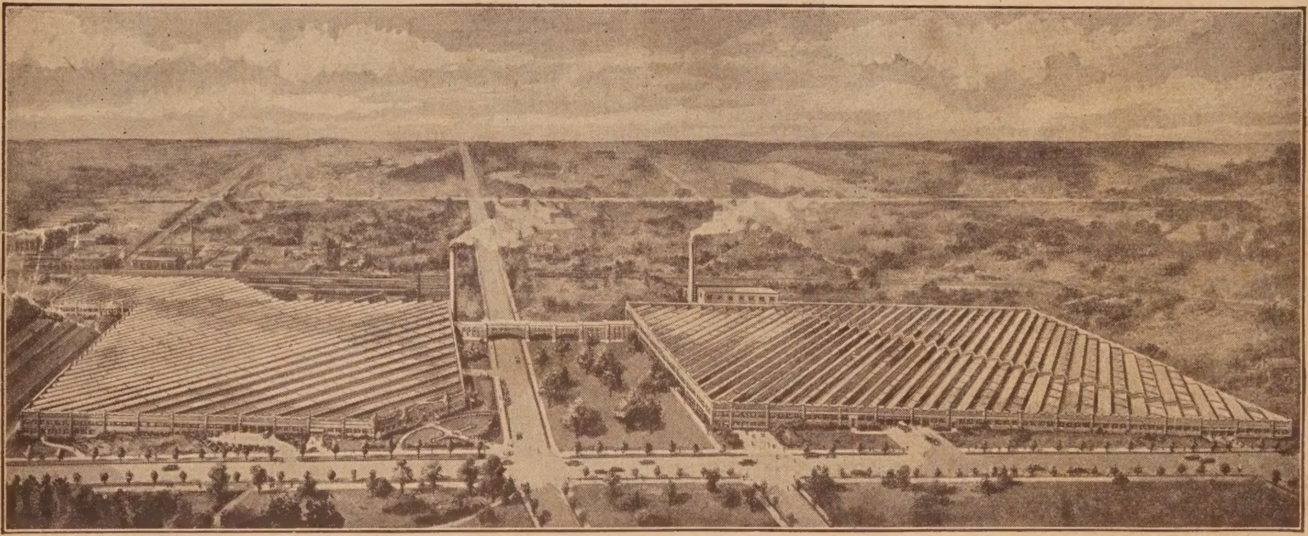
SERVICE MANUAL
AND
PARTS LIST

ATWATER KENT MFG. COMPANY
4700 WISSAHICKON AVENUE
PHILADELPHIA

ATWATER KENT RADIO

SERVICE MANUAL

JUNE, 1931



THE FACTORY BEHIND THE PRODUCT

This Supplement, Pages 1 to 120
Supersedes Pages 1 to 146, Previously Issued

ATWATER KENT MANUFACTURING COMPANY
4700 WISSAHICKON AVENUE, PHILADELPHIA, PA.

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INTRODUCTION

1. Purpose of Service Manual

The object of the Service Manual is to assist the retailer of Atwater Kent radio products in giving prompt and efficient service to the consumer-owner. Since in accordance with our Radio Service Policy, service on Atwater Kent radio products is to be handled by Atwater Kent dealers and distributors only, this publication should be considered confidential and except in special cases, is furnished only to regularly appointed outlets of Atwater Kent radio merchandise.

2. Importance of Service

Service has "come into its own" during the past few years and its importance is continually becoming more widely recognized. The value of prompt and courteous service by the dealer cannot be over-emphasized. Service is closely linked with sales—in fact the one depends on the other. The radio dealer who has foresight will build for the future by maintaining a neat and efficient repair department and employing a competent service personnel consistent with the size of his organization. There is no better step toward building good-will for Atwater Kent products in his immediate locality.

3. Dealer Service Procedure

The dealer who has a reasonably well equipped service shop will find that he is in a position to handle the servicing of practically any set which comes to him for repair, since the bulk of repairs will not be of a difficult nature.

In the event that he is unable to perform a certain repair, the set or unit should be returned to his local distributor, who maintains a complete service department similar to that of the factory. The distributor will furnish his dealers with complete instructions for return of material, such as making out of return report blanks and other routine in connection with the handling of service matters.

4. Dealer's Parts Stock

We strongly urge that every dealer carry in stock a supply of such repair parts as may be most commonly required for the more popular types of Atwater Kent sets and speakers. This will eliminate the possibility of a dissatisfied customer, resulting from the delay necessarily involved in ordering a part from the distributor.

Newly appointed dealers should consult their distributor regarding a suitable initial stock to be carried.

Repair parts must be purchased from the **distributor.** No parts are sold direct from factory to dealer.

5. Repair Charges—Warranty Repairs

The charge on a repair job for the consumer, on a set beyond the warranty, may be based on the consumer price of the repair parts used, plus a charge for the time required, at a definite rate per hour. The time charge will cover the time consumed in testing the set when repaired, and in calling for and delivering the set, if this is done.

Our factory warranty on new products, involves the replacement of parts defective in workmanship or material, and covers a period of 90 days from date of sale to the consumer.

6. Service Policy

A complete printed "Service Policy," definitely outlining the factory's plan on service matters, is sent once a year to our distributors, and such information from this as is required by the dealer will be passed on to him by the distributor. A definite understanding between dealer and distributor on all matters pertaining to service will be the means of preventing much conflict and controversy. It cannot be too strongly urged that all instructions from the distributor be carefully followed, so that complete co-operation will exist. Written instructions, such as bulletins, etc., should be kept handy in a loose-leaf note book.

7. Service Literature

The dealer will do well to keep readily available, ALL literature pertaining to service which comes into his place of business.

There are several excellent monthly radio trade publications which are invaluable to the retail dealer, both from a sales and service standpoint. We believe the small price of annual subscription to several of these magazines will be more than repaid by the excellent information and ideas they contain.

Two or three good text books on radio will also not be out of place on the dealer's book shelf. An easily understandable book on the theory of radio and a practical book on general radio service and repairing are suggested.

8. Factory Service Course

One of the best ways in which the recognized Atwater Kent dealer (or his service man) can familiarize himself more completely with the correct methods of servicing Atwater Kent radio products, is to spend a week or two in our factory Service Department. We have mapped out a course of training to be followed in this work, which completely covers the various steps in repairing, assembling, and testing all models of our sets, speakers, and power units.

The service course takes from one to three weeks depending on the ability of the individual. There is no charge for the instructions, but the dealer will naturally furnish the transportation and living expenses connected with this visit to Philadelphia. A letter of introduction from the local distributor is required and must be presented at the factory for identification purposes.

THEORY SECTION

Knowledge of Theory Is Essential

While the primary purpose of the Service Manual is to give the dealer information about testing and repairing Atwater Kent receiving sets, **we believe that an understanding of the fundamental principles of radio and a knowledge of how our sets function will enable him to perform this work more intelligently.** It is, of course, essential to know what to do to correct troubles, but a knowledge of the theory and functioning of the various units of the set will enable the repairman to locate the trouble more readily. If an unusual condition arises in a set, a repairman without a knowledge of the principles involved, can correct the trouble by "hit-or-miss" methods only. The service man who has this fundamental knowledge can analyze the condition and then determine the remedy.

The Theory Section

The theory section of this manual is not a complete course but it is intended for study in conjunction with a good radio text book.

Studying Radio

It requires continual study, observation, and actual experimenting to acquire a real understanding of radio. Experimenting will drive home facts that might otherwise be difficult to learn.

There are a few text books that give an outline for a course of radio experiments which require only simple and inexpensive equipment. For one who wants to learn radio, there is no better way to do it than to follow such an experimental course and supplement it with diligent study of a good radio text book.

Elements In Radio Receiver

In addition to tubes and speakers, there are only four general types of parts in a radio receiver: **Condensers, transformers, chokes,** and **resistors.**

In order to know how a receiver functions, it is necessary to understand the action of these parts on various types of current. A table covering this subject is given below, and more detailed information is given throughout the theory section.

ACTION OF RADIO PARTS ON VARIOUS TYPES OF CURRENT

Name of Part	Action of Part on Current of:			
	D. C.	A. C.		
		R. F.	I. F.	A. F.
Small Condensers, such as phone condensers, grid condensers, R. F. by-passes, etc.	Do not Pass	Pass	Pass	Do not Pass
Large Condensers, such as filter condensers, A. F. by-passes, etc.	Do not Pass	Pass	Pass	Pass
Resistors.	Oppose	Oppose**	Oppose	Oppose
R. F. Chokes or primaries of R. F. transformers.	Pass	Oppose	Pass	Pass
I. F. Chokes or primaries of I. F. transformers.	Pass	Pass*	Oppose	Pass
A. F. Chokes or primaries of A. F. transformers.	Pass	Pass*	Pass*	Oppose
Secondary of A. F. Transformers.	Pass	Pass*	Pass*	Oppose
Parallel Tuned R. F. Circuit. (Condenser and coil.)	Passes	Opposes R. F. of frequency to which it is resonant. Passes other R. F. frequencies.	Passes	Passes
Series Tuned R. F. Circuit. (Condenser and coil.)	Does not Pass	Passes R. F. of frequency to which it is resonant. Opposes other frequencies.	Opposes	Opposes
Parallel Tuned I. F. Circuit. (Condenser and coil.)	Passes	Passes	Opposes I. F. of frequency to which it is resonant. Passes other I. F. frequencies.	Passes
Series Tuned I. F. Circuit. (Condenser and coil.)	Does not Pass	Does not Pass	Passes I. F. of frequency to which it is resonant. Opposes other I. F. frequencies.	Does not Pass

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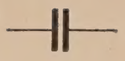
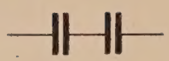
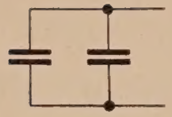
* This is true only if the I. F. or A. F. choke has a rather large distributed capacity. If the distributed capacity is small, an R. F. by-pass condenser is connected across the choke when necessary.

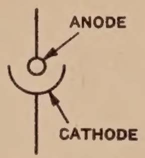
** In circuits carrying R. F. current, the effective value of a resistor will be reduced by the capacitance across the resistor terminals and its connecting leads, etc.

CONDENSERS

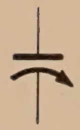

Fixed Condenser

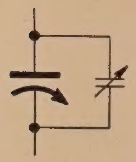

Fixed Condensers in Series


Fixed Condensers in Parallel



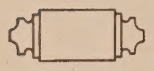
Electrolytic Condenser

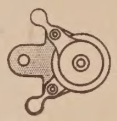

Variable Condenser

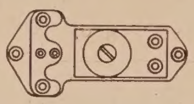

Variable Condenser with Trimmer

When condensers are connected in parallel, the total capacitance is equal to the sum of the values of all the condensers. When connected in series, the total capacitance is equal to the reciprocal of the sum of the reciprocals or $\frac{1}{\frac{1}{C1} + \frac{1}{C2}}$

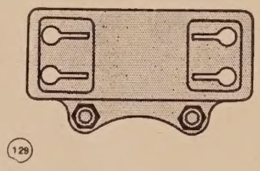
The capacitance of a variable condenser is greatest when the plates are meshed and lowest when the plates are not meshed.


Phone or Grid Condenser

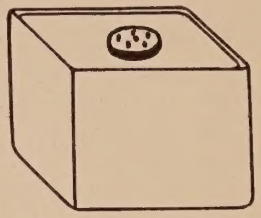

Phone or Stopping Condenser


Trimmer Condenser

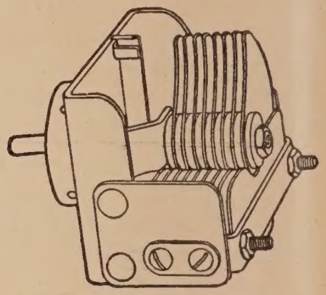
Mica Dielectric (Insulation Between Plates)



By-Pass Condenser

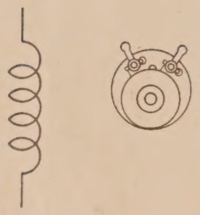

Filter Condenser Assembly for Power Unit

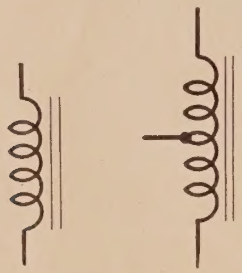
Tinfoil Plates and Paper Dielectric

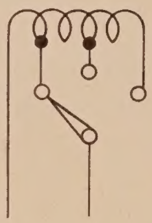

Variable Condenser Air Dielectric

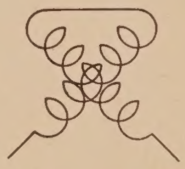
The movable plates comprise the rotor, and the stationary plates comprise the stator.

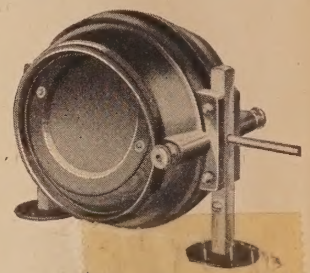
CHOKES


R. F. Choke Coil Offers a High Effective Resistance or Impedance to R. F. Current


A. F. Choke Coils Offer a High Effective Resistance or Impedance to A. F. Current

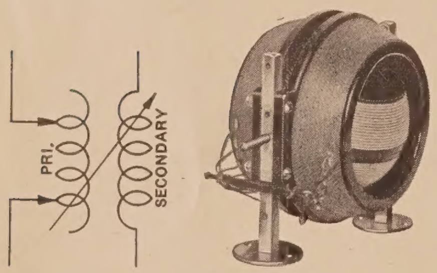

Tapped R. F. Inductance


Variometer or Continuously Variable Inductance

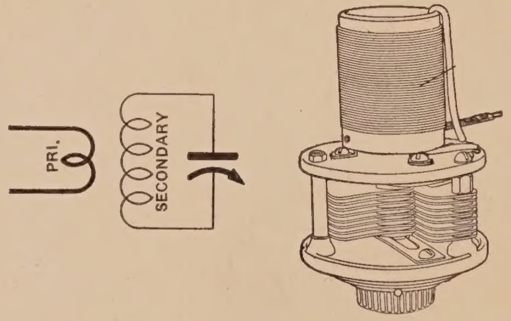

Variometer

The movable coil is the rotor, and the stationary coil is the stator.

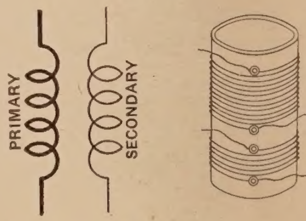
TRANSFORMERS



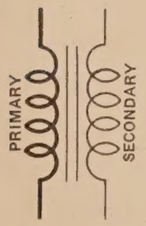
R. F. Vario-Coupler or Transformer with Tapped Primary



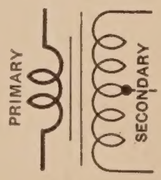
Tuned R. F. Transformer with Variable Condenser



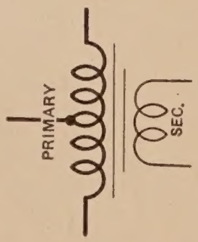
R. F. Transformer



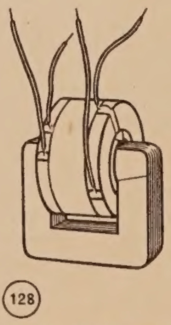
Audio-Frequency Transformer



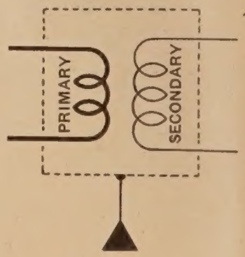
Input A. F. Transformer



Output A. F. Transformer

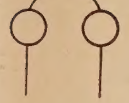


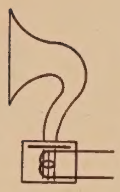
Audio-Frequency Transformer

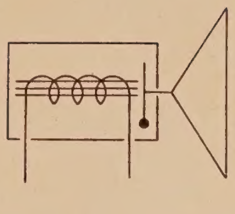


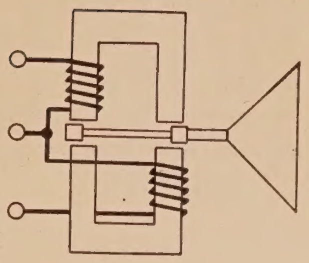
Shielded R. F. Transformer

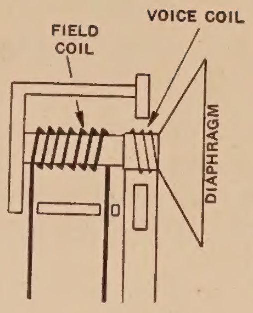
SPEAKERS


Head Phones

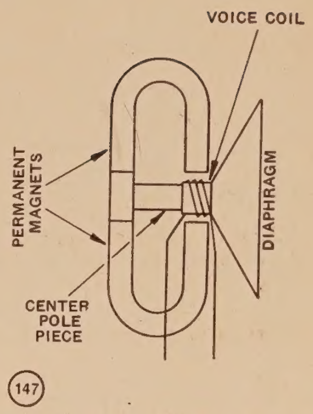

Horn Speaker


Cone Speaker


Inductor-Type Speaker

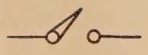


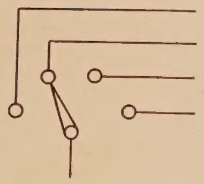
Electro-Dynamic Speaker with Electro-Magnet

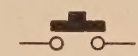


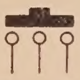
Electro-Dynamic Speaker with Permanent Magnet

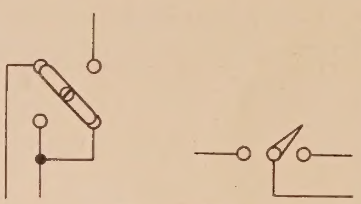
SWITCHES

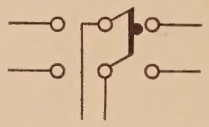

Single-Pole Single-Throw (S.P.-S.T.)

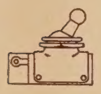

Four-Point Tap Switch

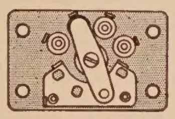

Single-Pole Single-Throw (S.P.-S.T.)


Three-Pole Single-Throw (T.P.-S.T.)

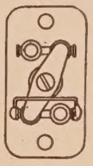

Single-Pole Double-Throw (S.P.-D.T.)


Double-Pole Double-Throw (D.P.-D.T.)

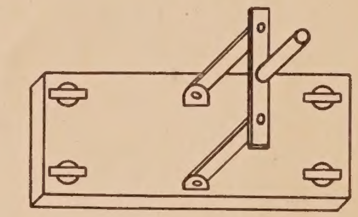

Toggle Switch


Four-Point Tap Switch

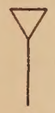
Single-Pole Double-Throw (S.P.-D.T.)

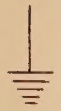


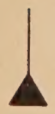
Double-Pole Double-Throw Switch (D.P.-D.T.)

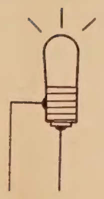


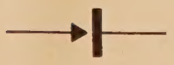
MISCELLANEOUS

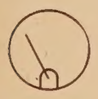

Antenna or Aerial (Inside or Outside Types)

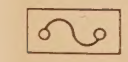

Ground or Earth

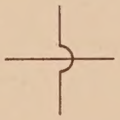

Chassis Connection (Connection to metal frame of set)

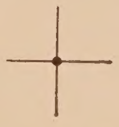

Dial Light to illuminate dial, or Pilot Light to indicate when current is on or off

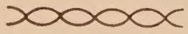

Crystal Detector

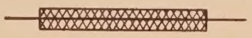

Current or Voltage Meter

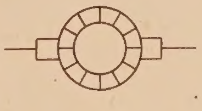

Fuse, used to prevent damage that might result from overload

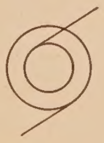

Wires Crossed, No Connection

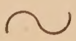

Wires Connected

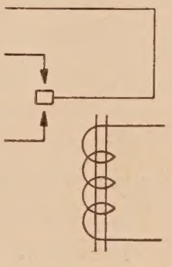

Twisted Pair

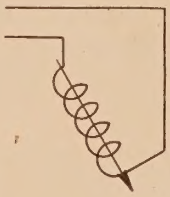

Shielded Lead

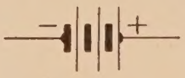

Direct Current Motor or Generator


A. C. Motor or Generator

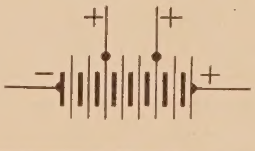

Sine Wave, symbol for alternating current or cycles


Relay. A relay may be regarded as an electrically-operated switch. There are numerous varieties.

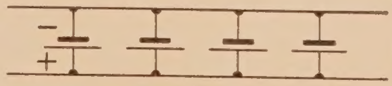

Phonograph Pick-up. The pick-up generates a weak current corresponding to the image of the sound waves cut in the grooves on a phonograph record.



Battery, storage or dry types.



Battery in Series. The total voltage equals the sum of the voltages of all the cells.



Batteries in Parallel. The total voltage is the voltage of one branch.

RESISTANCE AND VOLTAGE DROP

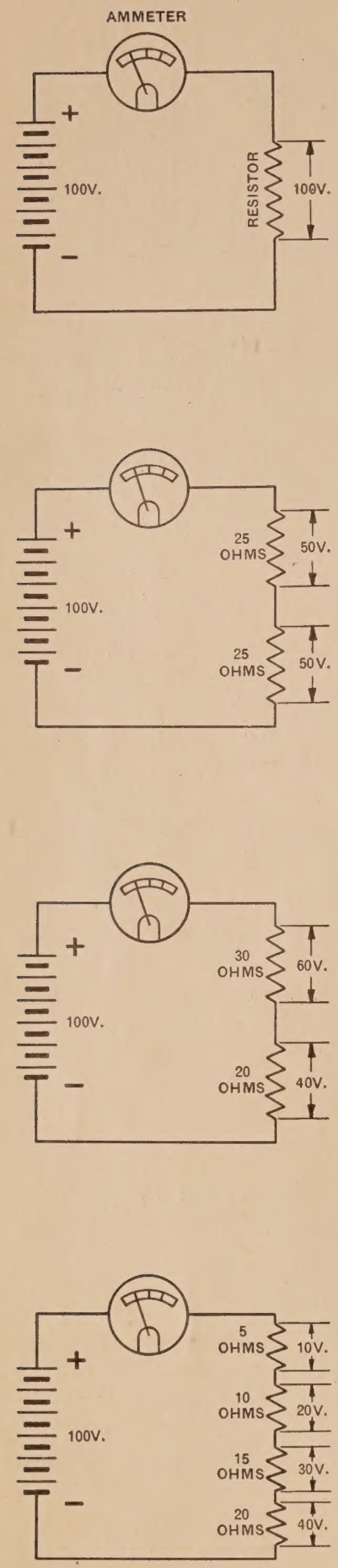

AMMETER
+
100V.
RESISTOR
100V.
−
+
25 OHMS
50V.
100V.
25 OHMS
50V.
−
+
30 OHMS
60V.
100V.
20 OHMS
40V.
−
+
5 OHMS
10V.
10 OHMS
20V.
100V.
15 OHMS
30V.
20 OHMS
40V.
−

Fig. 3 (Above.) In a Series Circuit, the Voltage Across One Resistor is to the Total Voltage as the Value of that Resistor is to the Total Resistance. This is explained in the text.

When analyzing trouble in a radio set, it is very helpful to have a clear idea of the relations between current, voltage and resistance in D. C. circuits. We therefore recommend close study of the diagrams and rules on this and the following page.

Voltage (electro-motive force or e. m. f.) is the pressure in an electrical circuit. The unit of pressure is the *volt.*

Current is rate of flow of electricity through the circuit. The unit of current is the *ampere.*

Resistance is the opposition a circuit offers to the flow of current. The unit of resistance is the *ohm.*

The relations between these units are given on the next page.

If we apply the rule regarding current to the three lower circuits shown in Figure 3, we find that in each case the current is two amperes (100 volts divided by 50 ohms equals 2 amperes). An example of parallel resistance is shown in Figure 3-A.

In a series circuit, the voltage across one part may be easily determined if we know the total resistance and the voltage in the circuit: First find the percentage that the resistance of the particular part has to the total resistance. The voltage across that part is that same percentage of the total voltage. Thus assume that in the bottom circuit of Figure 3, we want to know the voltage across the 5 ohm resistor. We know the total resistance is 50 ohms. Five ohms is 10% of the total resistance. In turn, 10% of the total voltage is 10 volts, which is the voltage across the 5-ohm resistor.

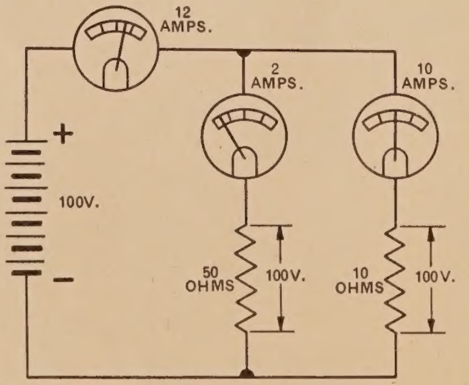
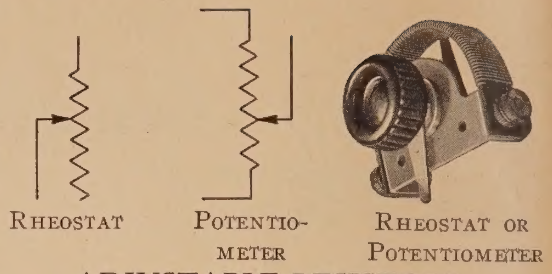
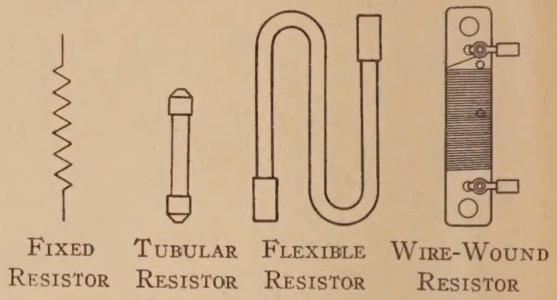

12 AMPS.
2 AMPS.
10 AMPS.
+
100V.
−
50 OHMS
100V.
10 OHMS
100V.

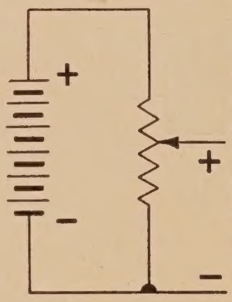
Fig. 3-A. Resistors in Parallel. When resistors are connected in parallel across a known voltage, the current through each resistor may be calculated separately ($I = \frac{E}{R}$). The total current equals the sum of the currents through the various resistors.


Rheostat
Potentiometer
Rheostat or Potentiometer

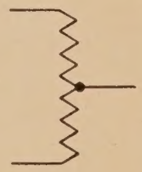
ADJUSTABLE RESISTORS


Fixed Resistor
Tubular Resistor
Flexible Resistor
Wire-Wound Resistor

FIXED RESISTORS



Potentiometer. The potentiometer or voltage divider is usually a resistor with an adjustable contact connected as shown at the left. It is used to secure any intermediate voltage from zero to maximum from a given source. In the circuit, when the slider is at the bottom of the resistor, the output voltage is zero. When the slider is at the top of the resistor, the output voltage is maximum. The potentiometer may be used in D. C., A. F., I. F., or R. F. circuits.



Filament-Shunt Resistor with centre tap. This is connected across A. C.-operated filaments and the grid-return leads of the tubes are connected to the centre tap. The purpose of the resistor is to minimize hum.

Resistance and Voltage Drop (Continued)

VOLTS = AMPERES × OHMS
$(E = I \times R)$

AMPERES = VOLTS ÷ OHMS
$(I = V \div R)$

OHMS = VOLTS ÷ AMPERES
$(R = V \div I)$

POWER (WATTS) = VOLTS × AMPERES
$(W = V \times A)$

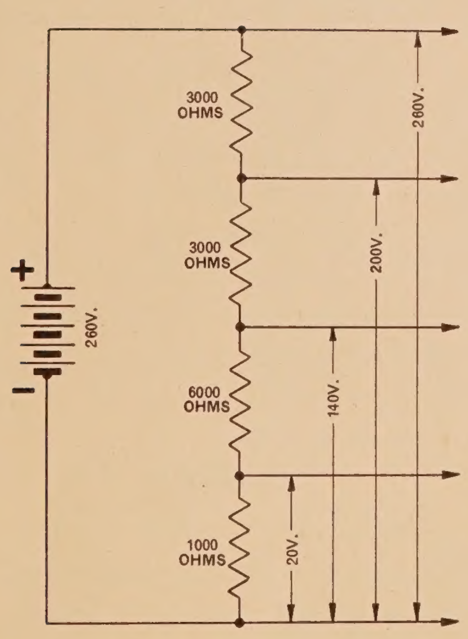
or

POWER (WATTS) = AMPERES SQUARED × OHMS $(W = I \times I \times R)$

Total value of resistances in series = $R1 + R2 + R3$, etc.

Total value of resistances in parallel
$$= \cfrac{1}{\cfrac{1}{R1} + \cfrac{1}{R2} + \cfrac{1}{R3}, \text{ etc.}}$$

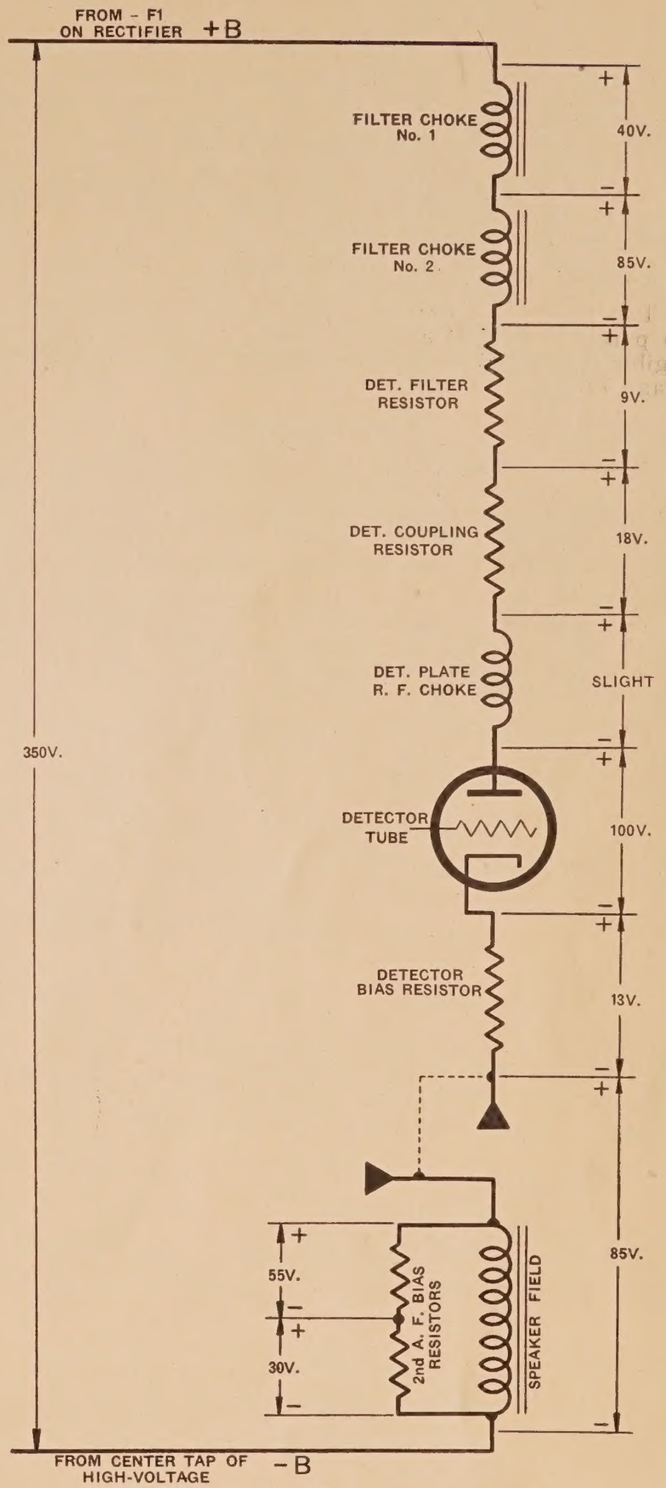
R1, R2, R3, etc., are the values of the separate resistors.



3000 OHMS
3000 OHMS
6000 OHMS
1000 OHMS
260V.
200V.
140V.
20V.
+
−
260V.

FIG. 4. VOLTAGE DISTRIBUTION ACROSS A SERIES OF RESISTORS.

The 1,000-ohm resistor is 1/13 of the total circuit resistance, so the voltage across it is 1/13 of the total voltage, or 20 volts. The first two resistors, totaling 7,000 ohms, represent 7/13 of the total resistance, so the voltage across them is 7/13 of 260, or 140 volts.



FROM − F1 ON RECTIFIER +B
FILTER CHOKE No. 1
FILTER CHOKE No. 2
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
DET. PLATE R. F. CHOKE
DETECTOR TUBE
DETECTOR BIAS RESISTOR
2nd A. F. BIAS RESISTORS
SPEAKER FIELD
350V.
40V.
85V.
9V.
18V.
SLIGHT
100V.
13V.
85V.
55V.
30V.
FROM CENTER TAP OF HIGH-VOLTAGE TRANSFORMER −B

FIG. 4-A. VOLTAGE DISTRIBUTION IN DETECTOR PLATE CIRCUIT OF MODEL 55.

When making voltage measurements and diagnosing trouble in case of incorrect voltage, it is extremely helpful to have a clear idea of voltage drop across resistors in a series circuit. Practically all radio trouble-shooting consists of simple D. C. voltage measurements.

It is important to remember that when measuring across an open resistor in a series circuit, the voltmeter completes the circuit and if the normal value of the resistor and the resistance of the meter are somewhat alike, the voltage reading may be very nearly correct.

Also it is important to remember that the voltmeter resistance will affect the resistance of the circuit and in general will make the measured voltage lower than the normal operating voltage. Thus, if the 50-volt scale of a 1,000-ohm-per-volt meter (in which case the meter resistance is 50,000 ohms) is used to measure the voltage across a 50,000-ohm resistor in a series circuit containing other resistors, the effective resistance is reduced to 25,000 ohms and the measured voltage will be correspondingly lower than the actual voltage.

INDUCTANCE, CAPACITANCE, REACTANCE AND IMPEDANCE

Inductance

A coil of wire is an **inductor** and it provides a property termed **inductance.** The inductance depends, among other things, on the number of turns of wire, the size of the coil, and whether the core is magnetic or non-magnetic.

A small number of turns provide a small inductance. A large number of turns provide a large inductance. A magnetic core increases the inductance.

The unit of inductance is the **henry.**

The total *inductance* of inductors connected in series or in parallel (without any couplings between them and negligible resistance) is calculated the same as for resistors (see Page 7).

Capacitance

Two conducting plates separated by an insulator comprises a **condenser.** A condenser provides a property termed **capacitance.** The capacitance depends, among other things, on the area of the plates, the distance between the plates, and the nature of the insulation **(dielectric)** between the plates.

The capacitance may be increased by increasing the area of the plates or by decreasing the distance between them. For a given distance between the plates, a paper or mica dielectric gives a higher capacitance than air.

The unit of capacitance is the **farad.** In radio work the unit commonly used is the **micro-farad** (mfd.) which is one-millionth of a farad.

The total *capacitance* of condensers connected in **series** equals $\frac{1}{C1 + C2}$, etc. Thus if two .0005 micro-farad (mfd.) condensers are connected in series, the total capacitance is .00025 mfd.

The total *capacitance* of condensers connected in **parallel** equals C1 + C2, etc. Thus if two .0005 mfd. condensers are connected in parallel, the total capacitance is .001 mfd.

Reactance

The **opposition** offered by a condenser or inductor to the flow of an alternating current is termed the **reactance.** In a condenser, it is capacitive reactance. In an inductor, it is inductive reactance.

The *reactance* of a **condenser** decreases as the frequency of the applied voltage increases.

$$\text{The capacitive reactance in ohms} = \frac{1}{6.28 \times \text{frequency in cycles/sec.} \times \text{capacitance in farads.}}$$

The *reactance* of an **inductor** increases as the frequency of the applied voltage increases.

$$\text{The inductive reactance in ohms} = 6.28 \times \text{frequency in cycles/sec.} \times \text{inductance in henries.}$$

The total *reactance* of inductors in parallel or series, or the *reactance* of condensers in parallel or series, is calculated in the same way as for resistors (see Page 7).

Impedance

Impedance is the **effective resistance** or **opposition** that a circuit or part offers to the flow of alternating current. Impedance is calculated from the resistance and reactance of the circuit or part.

ELECTRO-MAGNETIC FREQUENCY SPECTRUM

Name		Approximate Wave Length	Approximate Frequency in Kilocycles Per Second	Approximate Number of 10-Kilocycle "Channels" in Each Range
"Cosmic" Rays, X-Rays and Invisible Ultra-Violet Waves.		Extremely Short	Extremely High	
Visible Waves.		From Violet 0.000039 cm. To Red 0.000077 cm.	769,000,000,000 389,600,000,000	37,940,000,000
Infra-red and Heat Waves.		From 0.000077 cm. To 0.006 cm.	389,600,000,000 5,000,000,000	38,460,000,000
Long Heat Waves. Shortest Radio Wave Commonly Used.		About 0.006 cm. 5 Meters (500 cms.)	5,000,000,000 60.000	499,994,000
Short Radio Waves.		From 5 meters To 200 meters	60,000 1,500	5,850
Broadcast Radio Waves.		From 200 meters To 545 meters	1,500 550	95
Long Radio Waves	Ship-Shore Stations, etc.	From 545 meters To 2,500 meters	550 120	43
	High-Powered International Stations, etc.	From 2,500 meters To 30,000 meters	120 10	11
Audio Frequencies		From 30,000 meters To 18,750,000 meters	10 (10,000 cycles) .016 (16 cycles)	1

AUDIO-FREQUENCY RANGE OF A FEW MUSICAL INSTRUMENTS

Name		Approximate Range
String Instruments	Piano	16 to 5,200 cycles.
	Violin	192 to 3,072 cycles.
	Bass Viol	40 to 240 cycles.
Wind Instruments	Bass Tuba	44 to 340 cycles.
	Trumpet	160 to 960 cycles.
	Piccolo	512 to 4,608 cycles.
Human Voice	Bass	80 to 340 cycles.
	Tenor	128 to 480 cycles.
	Soprano	240 to 1.152 cycles.

PREFIXES

Deci- = one-tenth.
Centi- = one-hundredth.
Mil- or Milli- = one-thousandth.
Micro- = one-millionth.
Kilo- = 1,000 times.

MODULATED DIRECT CURRENT

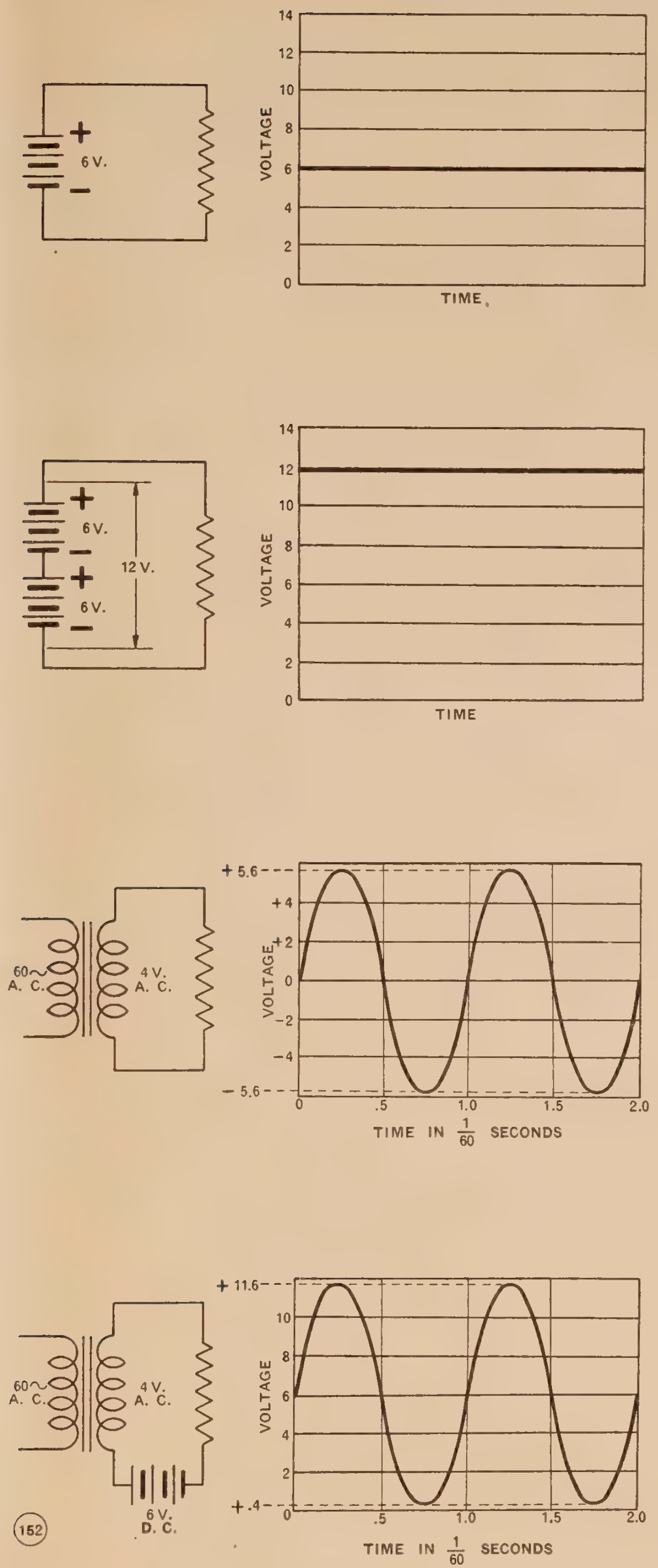
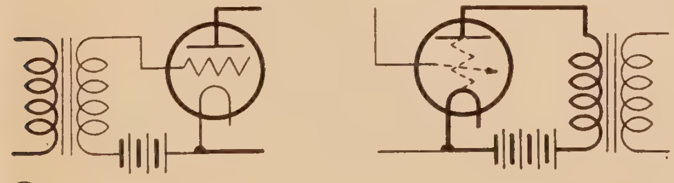


Fig. 5. Graphs of D. C., A. C. and Modulated D. C.



(151)

Fig. 5-A. When a Tube is in Normal Operation the Voltage on the Grid and on the Plate is Modulated or Pulsating D. C.

In direct current (D. C.) circuits, the polarity or positive (+) and negative (−) terminals remain the same at all times. Thus the carbon terminal of a dry cell is always positive with respect to the zinc (negative) terminal.

If the voltage or current of a direct-current circuit remains at one *value* it is termed **smooth direct current.** If the voltage or current does not remain constant but varies up and down, it is termed **pulsating or modulated direct current.**

Some form of modulated direct current is present in the grid and plate circuits of practically every tube in a radio receiver, consequently it is very important to understand the nature of this type of current.

The drawings on this page illustrate the nature of modulated direct current by showing how a direct current and an alternating current (A. C.) may be combined to produce modulated direct current.

At the top is a graph of the voltage of a battery. The voltage is six, and it remains at this value during the time indicated.

In the second drawing, two six-volt batteries are connected in series. The total voltage is twelve, and it maintains this value for the time indicated.

The third drawing shows two cycles of a four-volt sixty-cycle alternating-current supply. It will be seen that the voltage starts from zero, rises to a positive peak of 5.6 volts (the peak is about 1.4 times the effective value, as described on Page 11), decreases to zero, then increases to a negative peak of 5.6 volts, and returns to zero. This completes one cycle and requires 1⁄60 of a second.

If a direct current and a lower-value alternating current are combined in one circuit, the result is a modulated direct current.

Thus in the fourth drawing, four-volts A. C. and six-volts D. C. are connected in series. The battery voltage remains constant but the A. C. voltage varies between +5.6 volts and −5.6 volts. At any particular instant the total voltage is equal to the sum of the battery voltage and the voltage of the A. C. at that particular instant.

When the A. C. voltage is zero, the total voltage is 6 + 0 or 6 volts. When the A. C. voltage is at its positive peak, the total voltage is 6 + 5.6 volts or 11.6 volts. When the A. C. voltage is at its negative peak, the total voltage is 6 + (− 5.6) volts or + .4 volts. The voltage across the resistor therefor varies between a minimum of + .4 volts and a maximum of + 11.6 volts.

Modulated direct current may be compared to a cross section of the ocean. The depth of the water represents the D. C. voltage, and the waves on top represent the A. C. voltage. If the A. C. **component** (portion) is small compared to the D. C. component, we say that the D. C. voltage has an A. C. **ripple.** The terms pulsation, modulation, and ripple are sometimes used interchangeably.

In radio circuits, the A. C. component is the only useful part of modulated D. C. If we want to rock a boat, we need high waves but the depth of the water is not so important: Waves ten feet high in water twenty feet deep will rock a boat just as much as waves ten feet high in water 1,000 feet deep.

When we speak of the A. C. voltage on the grid or plate of a tube, we mean the A. C. component of the modulated D. C. voltage in the grid or plate circuit.

In order to keep the grid negative at all times we use a negative "bias" voltage of slightly greater value than the highest allowable positive voltage peak of the applied A. C. signal. Under these conditions the grid voltage never swings positive.

In the plate circuit of a tube, the action of the applied grid voltage is to increase and decrease the internal plate-cathode resistance, thus correspondingly increasing or decreasing the plate current above and below its normal value, but the plate current of a normally-operated tube never reverses.

It should be understood that the modulation does not have to be plain A. C.; it may be an irregular pulsation. The frequency may be R. F., I. F. or A. F. and these may be modulated by a lower frequency as explained on the next page.

MODULATED RADIO FREQUENCY

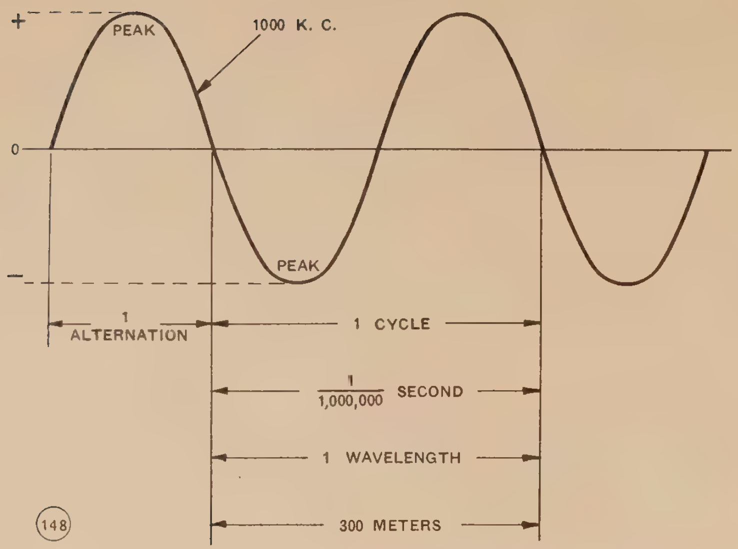


Fig. 6. Two Cycles of a 1,000 K. C.-per-Second Signal.

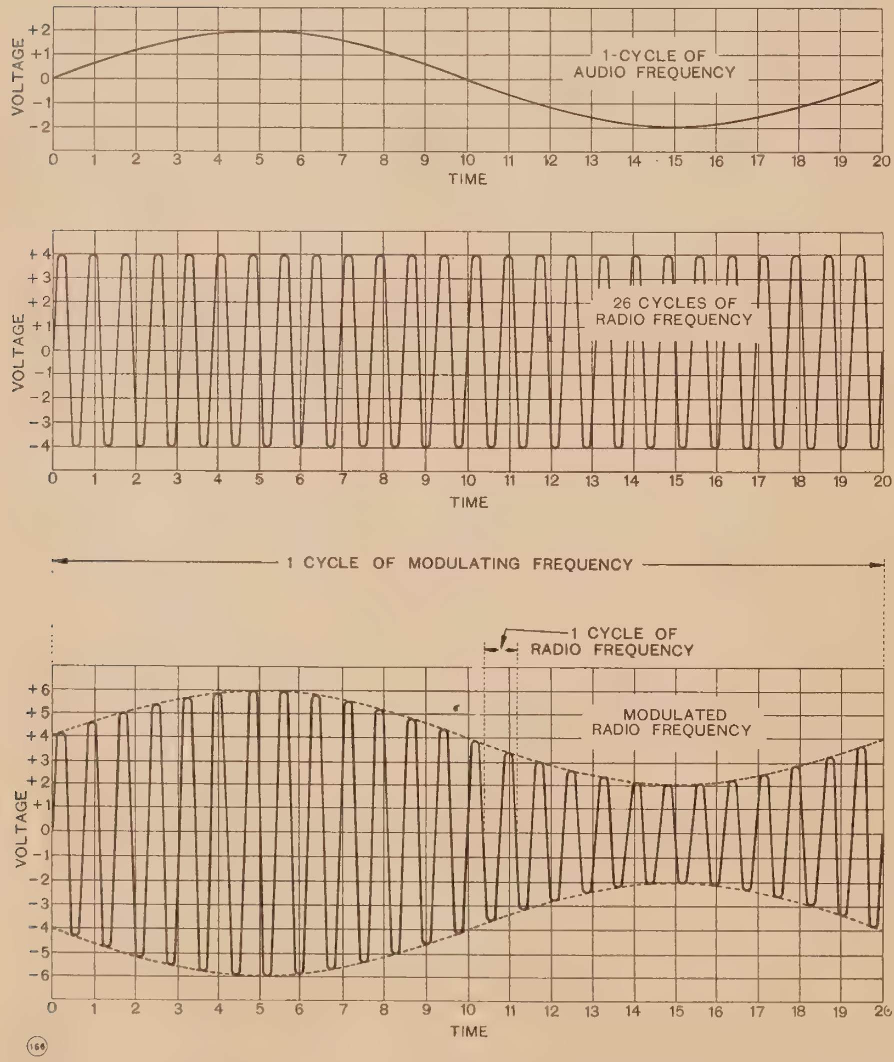


Fig. 6-A. Illustrating How a Radio-Frequency "Carrier" is Modulated.

In these graphs, each unit of time represents one-hundred-thousandth of a second (.00001 second). The audio frequency is therefore 5,000 cycles-per-second, and the radio frequency is 130,000 cycles-per-second.

In **alternating current** (A. C.) the polarity or positive and negative terminals reverse periodically. Thus one terminal of an A. C. generator is first positive with respect to the other terminal, then it changes to negative, then back to positive, and so on. The polarity alternates.

The term negative in reference to A. C. does NOT mean less than nothing. Negative merely means that the polarity of the voltage is reversed. The negative peak has the same force as the positive peak.

The value of an alternating current is continually changing. When we speak of four volts A. C., we mean the **effective value** which is equal to the value of a direct current that would produce the same heating effect. Actually the peak of a sine wave of alternating current is approximately 1.4 times the effective value. The effective value is approximately .7 of the peak.

A cycle of A. C. is the action in which the current starts from zero, passes through one peak, then through the reverse peak, and returns to zero.

An alternation is half of a cycle.

Frequency is the number of cycles in a given time, usually one second. Radio frequencies are generally expressed in kilocycles (K. C.) per-second. One K. C. equals 1,000 cycles.

The speed of electro-magnetic waves is approximately 186,000 miles or 300,000,000 meters per second.

In an electro-magnetic wave of one cycle-per-second, the beginning of the cycle will be one second or 300,000,000 meters away from the end of the cycle so the wave length is 300,000,000 meters. If there are two cycles-per-second, the beginning of a cycle will be one-half second or 150,000,000 meters away from the end of the cycle. If there are 1,000,000 cycles-per-second, the wavelength is 300 meters, and so on. Frequency may be converted to wavelength and vice versa as follows:

Modulated Radio Frequency (Continued)

Wavelength in meters = 300,000 divided by frequency in kilocycles.

Frequency in kilocycles = 300,000 divided by wavelength in meters.

Electro-magnetic frequencies cover from less than one cycle-per-second up to trillions of cycles-per-second. A table of electro-magnetic frequencies will be found elsewhere in this section. The particular range of frequencies used in radio has been chosen because it is best suited for this work. However, higher frequencies than those in the radio range, such as invisible infra-red frequencies and visible light frequencies can and have been used for transmission as **carriers** of voice impulses.

If the peak voltage or amplitude of an alternating current remains constant, it is usually termed a **continuous wave** (C. W.). If the peak voltage or amplitude of an alternating current does not remain constant, but varies up and down from its effective value, it is termed **modulated alternating current.**

In radio we are mostly concerned with radio-frequency energy modulated at an audio frequency rate.

The process of modulation is illustrated in Figure 6-A. The second graph represents unmodulated R. F. Note that the peak voltage of each alternation remains constant. In radio telephony, the unmodulated R. F. is termed the **carrier.** When the carrier is modulated, the peak voltage changes up and down from its normal value as shown in the bottom graph.

The R. F. carrier is inaudible; even if the loud speaker could respond to such high frequencies, they would be outside the range of our hearing.

It is the audio modulation or **change in amplitude** (voltage or intensity) of the carrier that produces audible sound in the speaker after passing through the receiver. The greater the **percentage of modulation** or change in amplitude, the louder the audible response.

The percentage of modulation is the ratio of half the difference between the maximum and minimum amplitudes of a modulated wave to the average amplitude, expressed in per cent.

In the bottom graph, Figure 6-A, the modulation is 50%. To get 100% modulation, the carrier would have to change from zero up to twice its normal (unmodulated) value.

Detection

After the modulated R. F. signal has been received, it must be rectified before it can be used to produce sound.

Rectification is accomplished by the detector which suppresses the effects of one side of the R. F. alternations, and allows the audio modulation of the remaining side to affect the phones or audio amplifier.

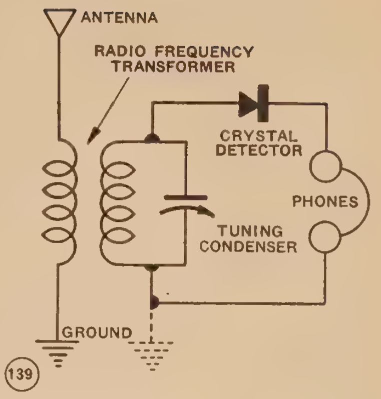

ANTENNA
RADIO FREQUENCY TRANSFORMER
CRYSTAL DETECTOR
PHONES
TUNING CONDENSER
GROUND
139

Fig. 7. Elementary Receiving Circuit, Comprising an Inductively Coupled R. F. Transformer with Tuned Secondary Circuit, a Crystal Detector and Head-Phones.

An elementary receiving circuit requires an **antenna** and ground circuit to pick-up energy from the passing electro-magnetic waves, a **tuner** to select the energy of the desired frequency, a **detector** to rectify the signal, and a **sound reproducer** to convert the modulation of the rectified signal into sound.

The signal may be amplified either before or after it is rectified, or both. If amplified before, it is a radio-frequency amplifier. If amplified after, it is an audio-frequency amplifier.

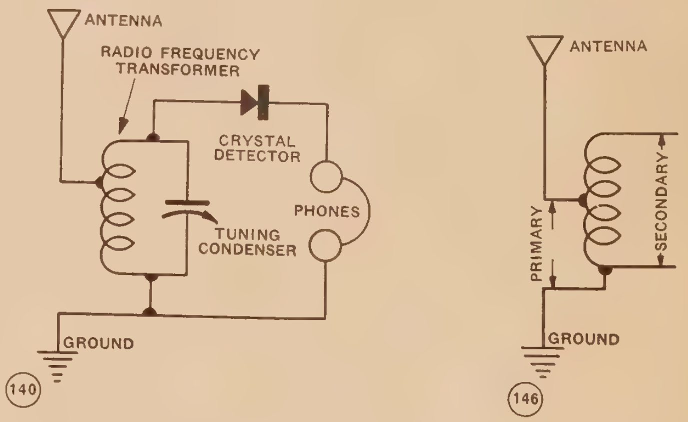

ANTENNA
RADIO FREQUENCY TRANSFORMER
CRYSTAL DETECTOR
PHONES
TUNING CONDENSER
GROUND
140
ANTENNA
PRIMARY
SECONDARY
GROUND
146

Fig. 7-A. Auto-Transformer Type of Coupling is Used Above.

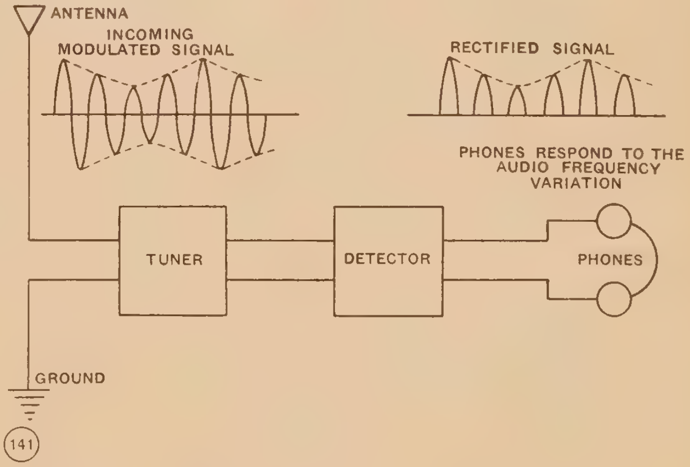

ANTENNA
INCOMING MODULATED SIGNAL
RECTIFIED SIGNAL
PHONES RESPOND TO THE AUDIO FREQUENCY VARIATION
TUNER
DETECTOR
PHONES
GROUND
141

Fig. 7-B. The Detector Serves to Cut Off One Side of the R. F. Alternations.

ACTION OF TRANSMITTER AND RECEIVER

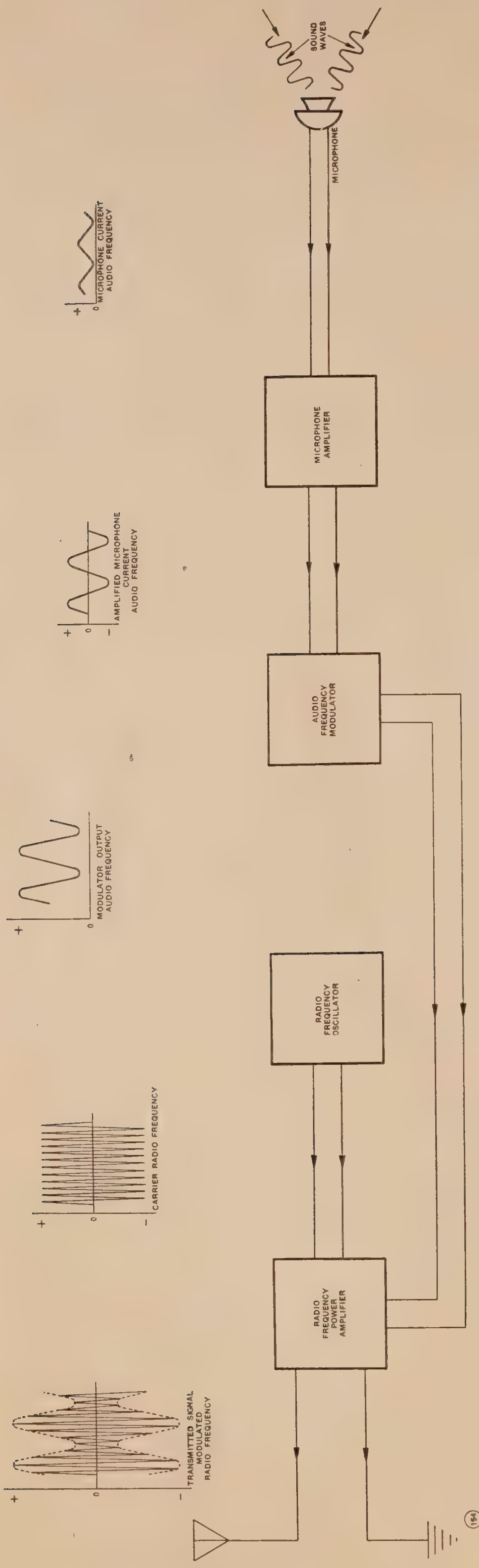

SOUND WAVES
MICROPHONE
MICROPHONE CURRENT AUDIO FREQUENCY
MICROPHONE AMPLIFIER
AMPLIFIED MICROPHONE CURRENT AUDIO FREQUENCY
AUDIO FREQUENCY MODULATOR
MODULATOR OUTPUT AUDIO FREQUENCY
RADIO FREQUENCY OSCILLATOR
CARRIER RADIO FREQUENCY
RADIO FREQUENCY POWER AMPLIFIER
TRANSMITTED SIGNAL MODULATED RADIO FREQUENCY
+
0
−
154

Fig. 8. Functional Diagram of a Transmitter, Indicating the Type of Current in Each Section.

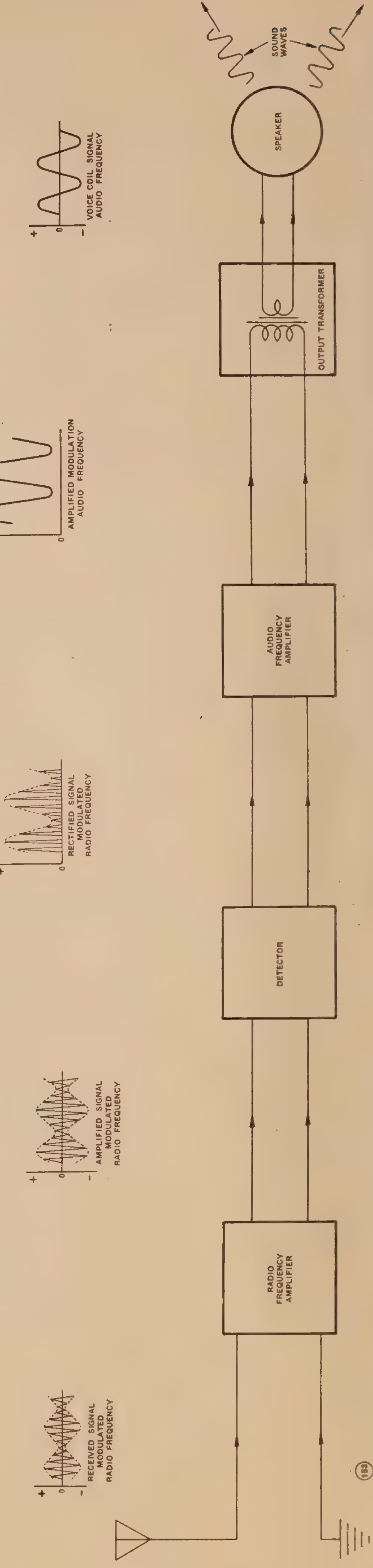

SOUND WAVES
SPEAKER
VOICE COIL SIGNAL AUDIO FREQUENCY
OUTPUT TRANSFORMER
AMPLIFIED MODULATION AUDIO FREQUENCY
AUDIO FREQUENCY AMPLIFIER
RECTIFIED SIGNAL MODULATED RADIO FREQUENCY
DETECTOR
AMPLIFIED SIGNAL MODULATED RADIO FREQUENCY
RADIO FREQUENCY AMPLIFIER
RECEIVED SIGNAL MODULATED RADIO FREQUENCY
+
0
−
183

Fig. 8-A. Functional Diagram of Receiver Showing How the Received R. F. Signal is Amplified and Rectified and How the Modulation of the Rectified Signal is Further Amplified and Fed Into the Speaker.

TUBE SYMBOLS AND SOCKET IDENTIFICATION

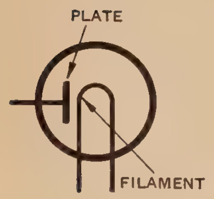
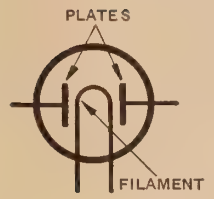


PLATE
FILAMENT

Half-Wave Rectifier. Current passes through the tube only every other half-cycle when the plate is positive. The current flow is only in one direction, or rectified.


PLATES
FILAMENT

Full-Wave Rectifier. When connected as shown in Fig. 22, on Page 24, current passes in the same direction through the tube during each half-cycle of the alternating-current supply. One plate functions during one-half cycle, and the other plate functions during the next half-cycle.

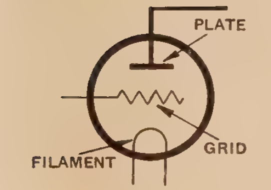


PLATE
FILAMENT
GRID

Triode (Three-Element) Plain-Filament Tube. This type of tube is used as amplifier, detector and oscillator. A few examples of this type are the '199, '201-A, '226 and '245.

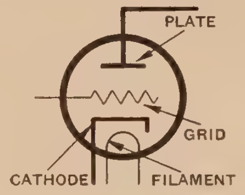


PLATE
GRID
CATHODE
FILAMENT

Triode (Three-Element) Heater-Type Tube. Detector, amplifier, and oscillator. The '27 tube is an example of this type.

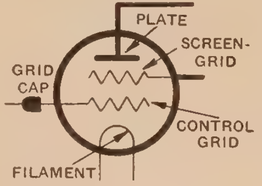


PLATE
SCREEN-GRID
GRID CAP
CONTROL GRID
FILAMENT

Tetrode (Four-Element) Screen-Grid Plain-Filament-Type Tube. This tube is used for radio-frequency or intermediate-frequency amplification. It provides much greater amplification than corresponding triode tubes. It is also employed as a detector. The '22 tube is of this type.

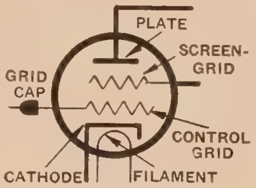
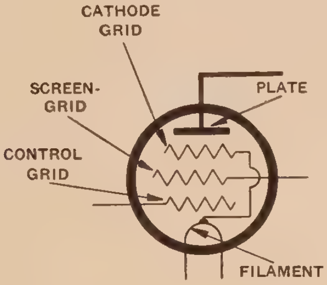


PLATE
SCREEN-GRID
GRID CAP
CONTROL GRID
CATHODE
FILAMENT

Tetrode (Four-Element) Screen-Grid Heater-Type Tube. Used as amplifier or detector in R. F. or I. F. circuits with A. C.-filament supply. The '24 tube is an example of this type.


CATHODE GRID
SCREEN-GRID
PLATE
CONTROL GRID
FILAMENT

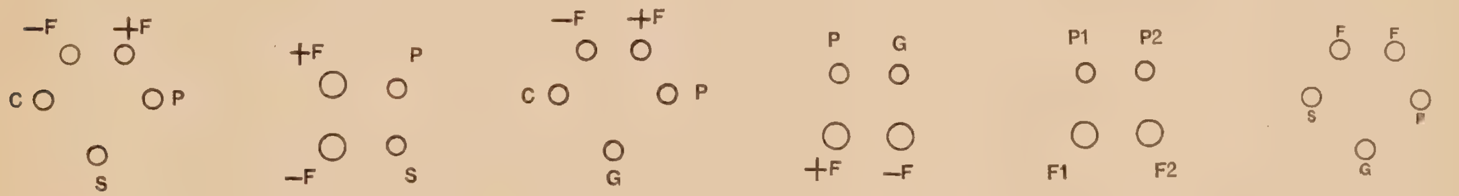
Pentode (Five-Element) Screen-Grid Plain-Filament Type Tube. Used as a power output tube. Provides high amplification and high power output.

Amplification Factor: A measure of the effectiveness of the grid voltage relative to that of the plate voltage in affecting the plate current.

Mutual Conductance: The ratio of the change in plate current to the change in grid potential producing it, under the condition of constant plate voltage.

Power Amplification: The ratio of the alternating-current power produced in the output circuit to the alternating-current power supplied to the input circuit.

Voltage Amplification: The ratio of the alternating voltage produced at the output terminals of an amplifier to the alternating voltage impressed at the input terminals.


—F
+F
C
P
S
+F
P
—F
S
—F
+F
C
P
G
P
G
+F
—F
P1
P2
F1
F2
F
F
S
P
G

Heater-Type (A. C.) Screen-Grid Four-Element Tube

Battery-Type (D. C.) Screen-Grid Four-Element Tube

Heater-Type (A. C.) Three-Element Tube

Plain Filament (A. C. or D. C.) Three-Element Tube

Full-Wave Rectifier Tube

Plain Filament (A. C. or D. C.) Five-Element Pentode

SOCKET CONNECTIONS FROM BOTTOM

On some sockets, the +F and —F are reversed.

The markings —F and +F on A. C. sockets are used only for identification purposes, as the A. C. filaments have no fixed polarity.

RADIO TUBES

A radio tube may be thought of as an ultra-sensitive relay that will operate from exceedingly small input power of direct voltage, or alternating voltage of any frequency, and release locally-supplied energy of much greater intensity than the input power.

But even the very best mechanical relay could not begin to duplicate the versatile and amazing properties of a radio tube.

The radio tube has no mechanical action; the input voltage, without loss to itself, controls a stream of electrons inside the tube, which is caused to flow by a local source of electrical energy.

(a) Elements in Radio Tube

In a three-element tube such as the 201-A, 226, 171-A, 245, 250, etc., there are three elements or electrodes (see Fig. 10):

1. **The filament,** which is heated by a low-voltage source of electricity, **emits or gives off electrons,** which have a negative charge of electricity.

2. **The plate,** which is maintained at a high positive voltage with respect to the filament, surrounds the filament and it **attracts the negatively-charged** electrons, so that a stream of electrons flows from the filament to the plate.

This stream of electrons provides a path for current to pass from the plate to the filament. The strength of this plate-circuit current depends on the number of electrons flowing from filament to plate.

Increasing the electron-flow increases the plate-circuit current; decreasing the electron-flow decreases the plate-circuit current.

3. **The grid,** which is placed between the filament and plate, **acts to control the number of electrons flowing from the filament to the plate;** this control is exercised by the voltage on the grid with respect to its filament.

When the grid voltage is made negative with respect to the filament, the grid repels the electrons from the filament and therefore diminishes the flow of electrons from filament to plate. This decreases the plate-circuit current.

When the grid voltage is made less negative with respect to its filament, the repelling action of the grid on the electrons becomes less, consequently more electrons flow from filament to plate. This increases the plate-circuit current.

The grid, through the action of its voltage, acts as a gate or valve to control the flow of electrons from filament to plate, and it thus exercises complete control on the plate-circuit current.

There is no time-lag in this control. Even if the grid voltage varies up and down millions of times each second, it will produce a corresponding variation in the plate-circuit current.

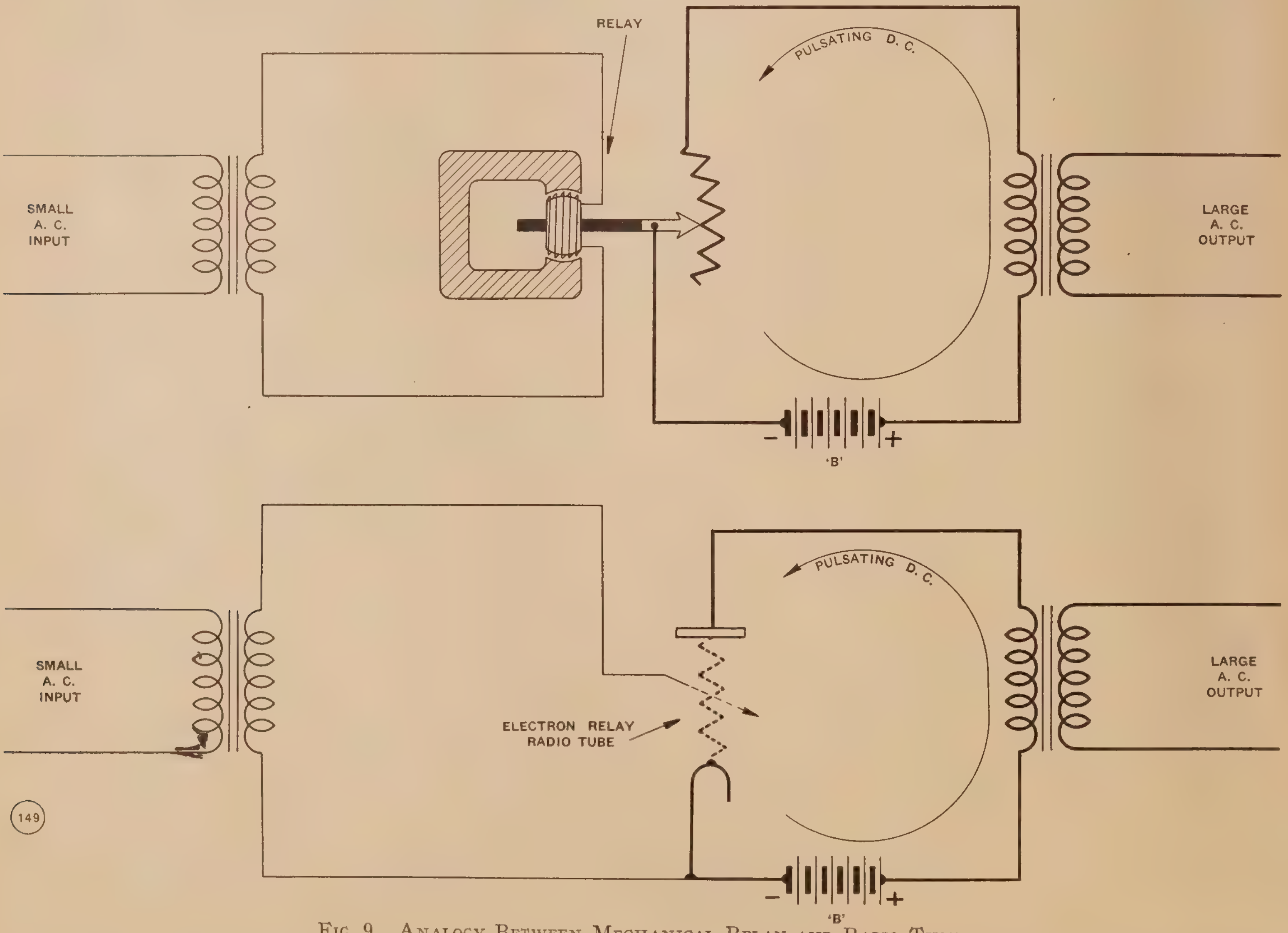


Fig. 9. Analogy Between Mechanical Relay and Radio Tube.

In the top view a mechanical relay operating from a low input voltage, controls a large output by varying the value of a resistor in the output circuit. This is analogous to the action of a radio tube in which a small input voltage on the grid controls the internal plate-to-filament resistance and thus produces a large output from the local "B" supply.

Radio Tubes (Continued)

The plate-circuit current follows the form of the grid voltage very closely, so that the output of the tube is a close duplicate of the input energy. In other words, when the tube is properly operated, there is no distortion.

For battery-operated tubes, three batteries are used:

1. The "A" or filament battery, which heats the filament.
2. The "B" or plate-circuit battery, which makes the plate positive with respect to the filament.
3. The "C" or grid-bias battery, which is used for the reasons given below.

(b) Necessity for Negative Grid Bias

If the grid voltage becomes even slightly positive with respect to the filament (or cathode), electrons will flow from filament to grid, and current will pass from grid to filament.

This is equivalent to placing a varying resistance load across the grid (input) circuit at such moments that the grid is positive.

If this condition exists in an audio-frequency amplifier, it produces distortion and decreased amplification. In a radio-frequency amplifier, it produces decreased amplification and broadened tuning.

For these reasons it is imperative in an amplifying-tube circuit that the grid be kept negative with respect to the filament (or cathode) at all times.

The negative bias must not be too great, otherwise another form of distortion will occur. The correct bias is determined from the characteristics of the tube at the operating voltages.

(c) A. C.-Filament Type of Three-Element Tube

As the number of electrons emitted by the filament depends on the temperature of the filament, it is important that the filament temperature be maintained constant, otherwise an undesired variation in the plate-circuit current will be produced.

Also, changes of voltage at any point on the filament is equivalent to changing the grid voltage with respect to that point on the filament. This will produce an undesired variation in the electron flow. This condition is encountered if we use a high A. C. voltage to heat the filament.

Therefore in A. C.-filament tubes, the filament is designed to operate at low voltages and also to have slow heating qualities. In these tubes, the change in voltage at any point on the filament is so small that its effect on the electron flow is very slight.

(d) Heater-Type Tubes

The heater-type tube is a considerable improvement over the plain A. C.-filament tube in the reduction or elimination of hum.

The heater-type tube has a filament inside a porcelain tube. A "cathode" surrounds the porcelain tube. It consists of a cylinder of metal on which is deposited a substance which freely emits electrons when heated.

The filament heats the cathode. The cathode, when heated, gives off electrons. The filament and cathode may be regarded as one element.

Owing to the construction of the cathode, it maintains a constant temperature and the same voltage all over, even when A. C. is used to heat the filament.

The electrons emitted by the cathode are attracted to the plate, and this flow of electrons is controlled by the grid in the manner previously described.

The symbol for a heater-type three-element vacuum-tube is shown in Fig. 11.

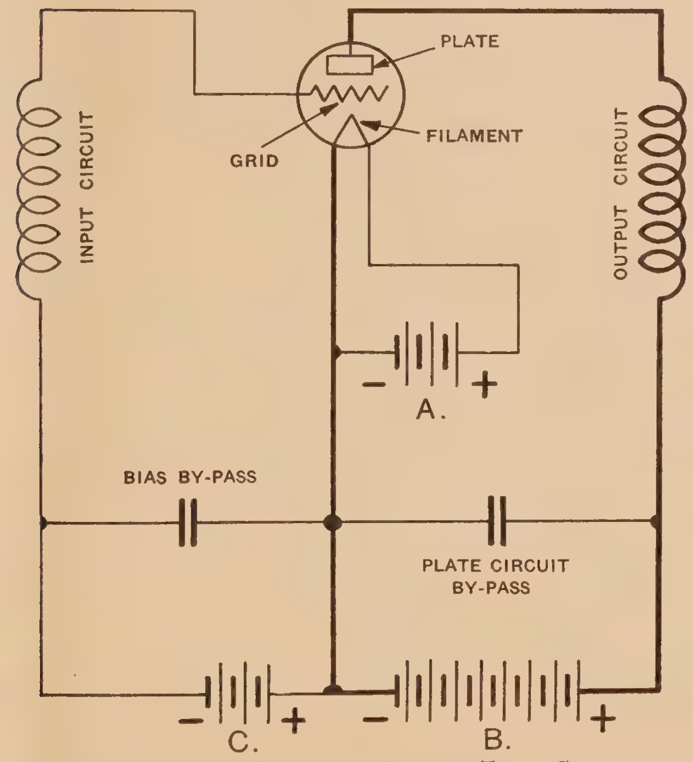


Fig. 10. Three-Element Vacuum-Tube Circuit with Plain Filament.

The output, or plate circuit, is shown in heavy lines.

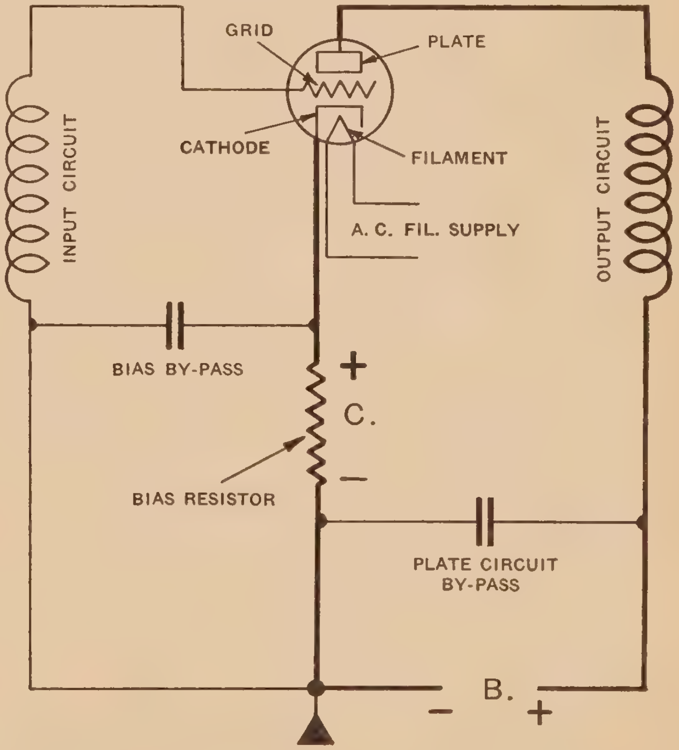


Fig. 11. Heater-Type Three-Element Vacuum-Tube Circuit.

Radio Tubes (Continued)

(e) Screen-Grid Tubes

The screen-grid tube is similar in construction to the regular three-element tube, except that an additional element, the screen, or screen-grid has been added. This screen, in the form of a spiral of wire, is placed between the control-grid and the plate. The screen also covers the top and the outside of the plate, and the bottom of the control-grid, thus completely shielding the control-grid from the plate.

The symbol for a plain-filament type of screen-grid tube is shown in Fig. 12.

In this diagram it will be noted that the screen is maintained at a positive voltage with respect to the filament.

Electrons, attracted by the positive charge on the screen flow from the filament and pass through the spaces between the wires of the control grid. Most of these electrons pass through the spaces in the screen wires and, owing to the high plate voltage, go to the plate.

The sensitivity or amplification of the screen-grid tube depends, among other things, on the screen voltage. Greatest amplification is secured when the screen is operated at its maximum rated value. The amplification decreases as the screen voltage is decreased. By making the screen voltage adjustable, the output volume of the set may be controlled. The methods of obtaining suitable ranges of screen voltage are described later.

For radio-frequency amplification the screen-grid tube has two very important advantages over the ordinary three-element tube.

First: In a three-element tube, at a given moment while a signal is being received, the following action takes place:

(1)	(2)	(3)	(4)
When the control-grid becomes more negative—	the electron flow decreases—	but the plate voltage increases—	and this tends to increase the electron flow.

From this it will be seen that (2) and (4) oppose each other, thus limiting the available amplification of the tube. (This opposition is present also when the control-grid is becoming less negative.)

In a screen-grid tube, the action is different:

(1)	(2)	(3)	(4)
When the control-grid becomes more negative—	the electron flow decreases—	and the voltage on the plate increases—	but, owing to the influence of the screen, the increase of plate voltage does not tend to increase the flow of electrons.

Therefore, in the screen-grid tube, there is negligible opposition to the control by the grid of the electron stream. As a result, the available amplification is increased.

The action of the screen in shielding the electron stream in the tube from voltage changes on the plate is the main reason why the actual R. F. amplification of the screen-grid tube is rated at about 50, compared to about 8 for the old-style three-element tube.

Second: The high amplification of the screen-grid tube could not be utilized in R. F. circuits if it were not for the fact that the screen also eliminates capacity coupling between the plate and grid electrodes within the tube, and thus prevents the possibility of feed-back between these two elements.

A more detailed explanation of this action is given on Pages 7 to 14, inclusive, of a booklet (Ser. D. 59) entitled "A Description of the New Atwater Kent Screen-Grid Receivers."

(f) The Pentode Tube

The pentode tube is a five-element power amplifier. It has twice the available undistorted output and six times greater amplification than the customary three-element output tube.

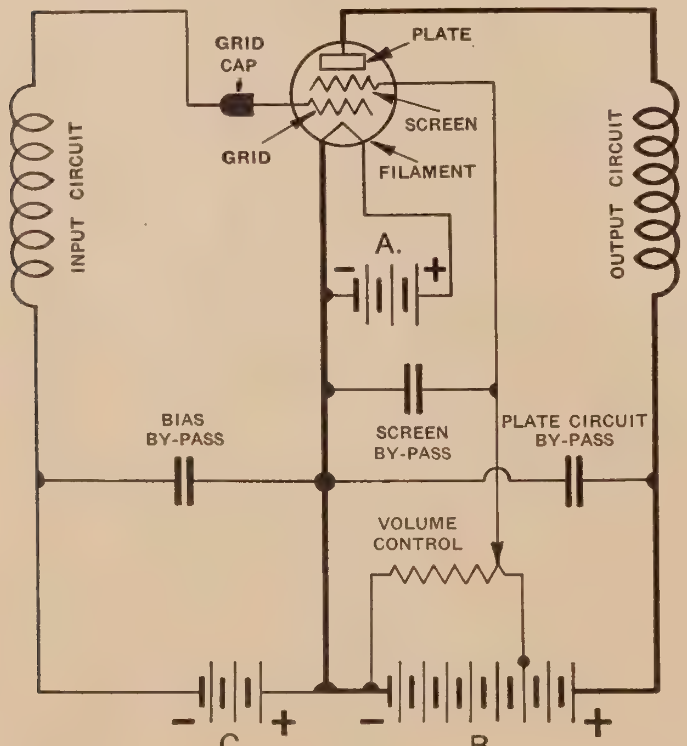


Fig. 12. Four-Element (Screen-Grid) Vacuum-Tube Circuit with Plain Filament.

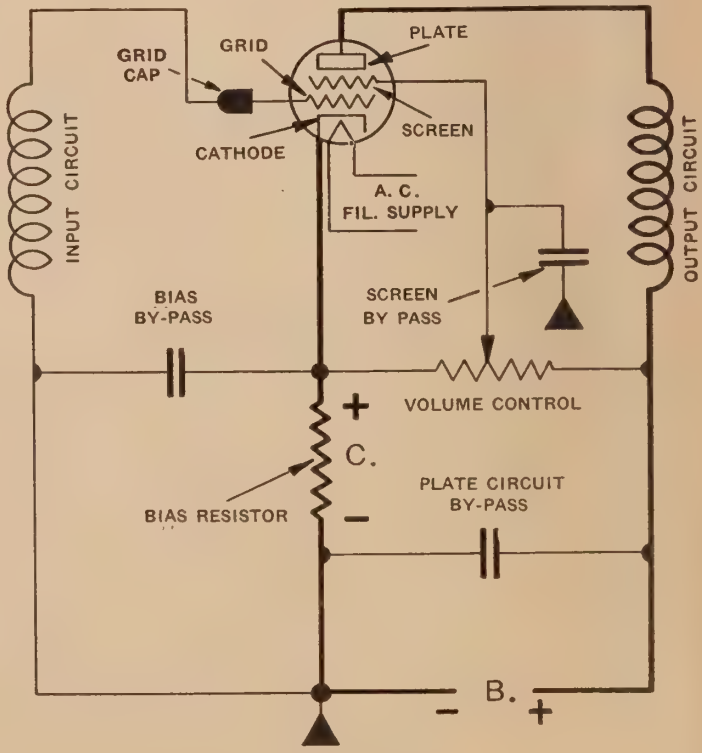


Fig. 13. Heater-Type Four-Element (Screen-Grid) Vacuum-Tube Circuit.

Radio Tubes (Continued)

The principle of the screen-grid tube is utilized in the pentode to secure exceedingly high audio-frequency amplification. In addition, the pentode has one extra element, the cathode-grid, that enables the pentode to handle large output power.

In order to appreciate the advantage of the pentode, it is necessary to understand an action, termed secondary emission, that limits the available power output of an ordinary screen-grid tube.

There are three points to consider:

First.—A screen-grid tube that is intended for use as a power output tube must have a high plate current. To accomplish this, it is necessary to use a high voltage on the screen-grid (about as high as the plate voltage).

Second.—To secure the largest possible output from a tube, it is necessary to have the largest possible voltage variation across the output circuit of the tube. In other words, the variation of plate voltage (resulting from the impressed signal) must be as large as possible.

Thus if the normal plate voltage of a tube is 250 volts, greatest output will be secured if the plate voltage variations run from 250 volts down nearly to zero, then up to almost 500 volts, then back towards zero, and so on.

From this it will be seen that the plate voltage must decrease considerably below its normal value during one-half the cycle of the impressed signal. The screen voltage remains constant, and if it equals the normal plate voltage, it will be readily seen that during one-half the cycle of the impressed signal, the plate voltage becomes less than the screen voltage.

Third.—In a screen-grid tube, when electrons hit the plate they tend to dislodge other electrons from the plate. When the plate voltage is less than the screen-grid voltage, the dislodged or secondary electrons will flow from the plate to the screen-grid. This flow of secondary electrons away from the plate is just opposite to the desired flow of electrons towards the plate. If this secondary emission becomes appreciable, it makes the tube useless as a power amplifier.

(In an R. F. screen-grid tube, the plate voltage is always higher than the screen voltage, so the secondary electrons fall back on the plate and cause no harm.)

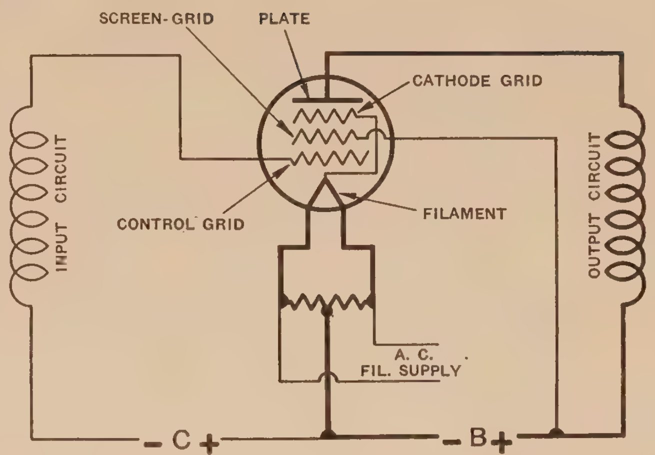


Fig. 14. Five Element (Pentode) Power Tube with Plain Filament.

From these three points we can realize that in order to get large power output from an ordinary screen-grid tube we encounter conditions that promote secondary emission and thus nullify our aim.

In the pentode tube, the effects of secondary emission are eliminated by the addition of an extra element, the cathode-grid, which is placed between the screen-grid and the plate, and is connected internally to the centre-point of the filament.

The secondary electrons emitted from the plate find themselves surrounded by the zero-potential cathode-grid, through which they would have to pass in order to reach the screen-grid. As the electrons have a negative charge they are repelled from the cathode-grid and are attracted by the positive voltage on the plate, even when the plate voltage is low, so they fall right back onto the plate and therefore have no effect whatsoever on the action of the tube.

The addition of the cathode-grid makes it possible to use a high screen-grid voltage, and also allows the plate-voltage variations to decrease almost to zero, thus providing high output power without any ill-effects from secondary emission.

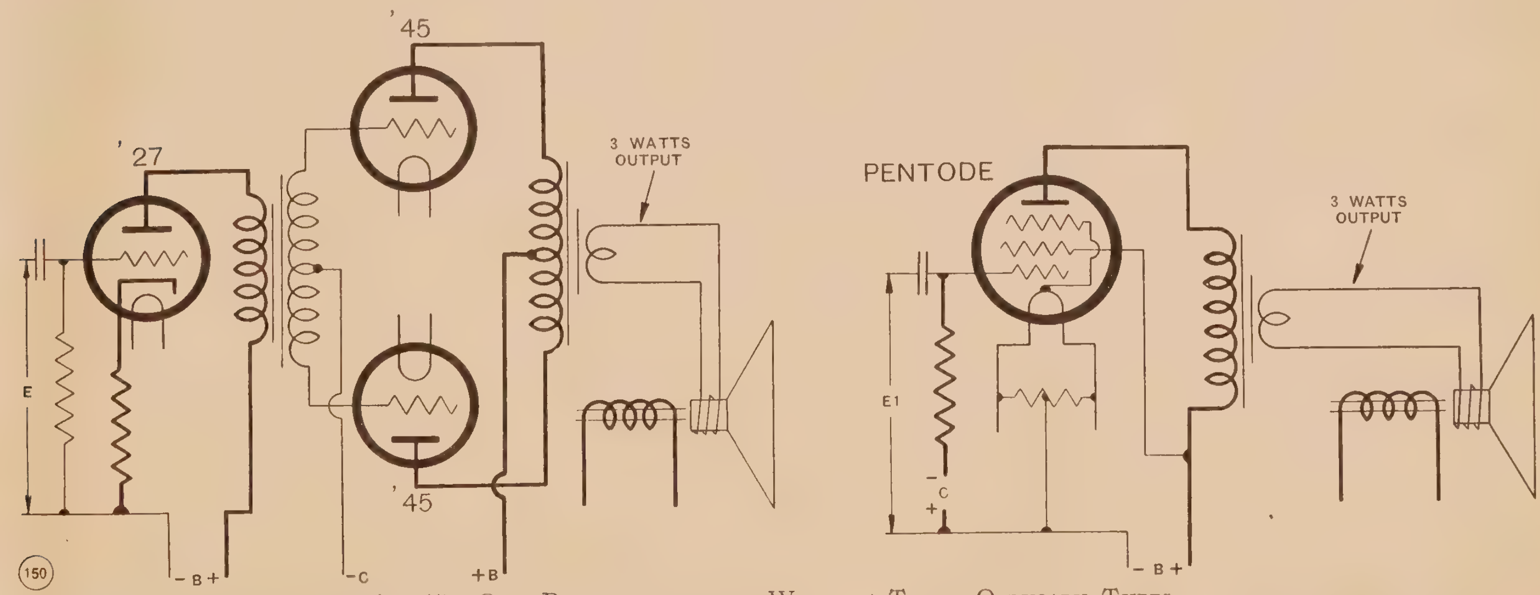


Fig. 15. One Pentode does the Work of Three Ordinary Tubes.

For the same input voltage at E and E1, the one pentode provides as much audio amplification and power output as the combination of one '27 and two '45s.

AN EXPLANATION OF THE ACTION OF ATWATER KENT TUNED-R. F. SCREEN-GRID RECEIVERS

Some idea of the action of Atwater Kent tuned-R. F. screen-grid receivers may be gained by studying the diagram of early Model 55 and 55-C in Fig. 15-A.

We will first briefly review the nature of radio broadcast energy, then consider the receiving circuit, and finally the power supply system in A.C.-operated models.

A. Energy Radiated from Transmitter

The electro-magnetic energy radiated by the antenna of a broadcast station has a definite normal frequency somewhere in the broadcast range of radio frequencies. The broadcast range extends from 550,000 cycles-per-second to 1,500,000 cycles-per-second. (This may also be expressed as 550 K. C. to 1,500 K. C., where K. C. is the abbreviation of kilocycles and is equivalent to 1,000 cycles-per-second.)

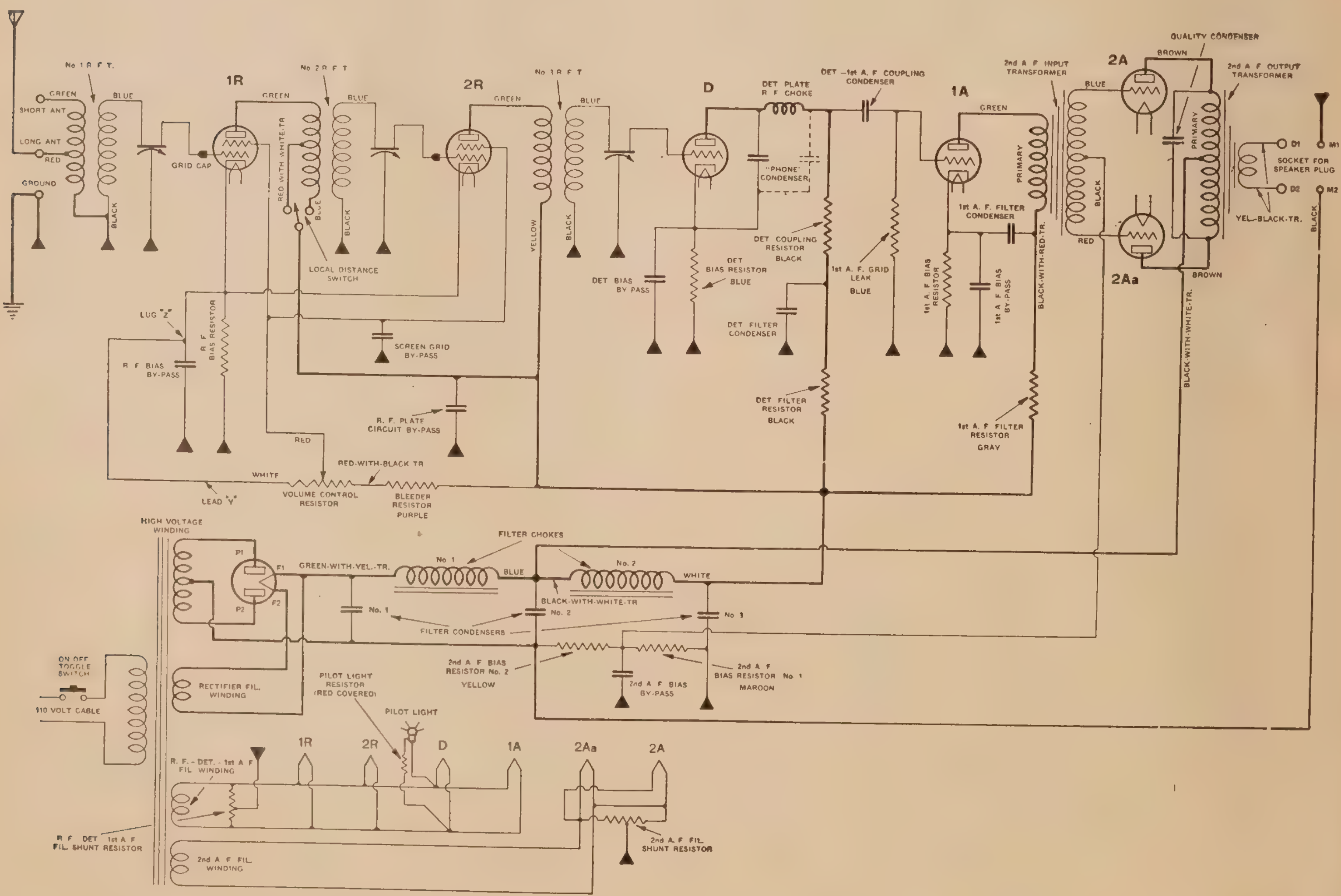
This normal operating frequency of a broadcast station is known as the "carrier" or carrier frequency.

When the broadcast station is transmitting voice or music, the audible sound, operating through a microphone and amplifier, causes audio-frequency variations in the strength, or intensity, of the carrier frequency.

This variation of the strength of the carrier frequency is known as modulation. The carrier frequency is inaudible. It is the effect of the audio-frequency variation of intensity of the carrier, i. e., the modulation, that produces audible sound in the speaker after passing through the receiver.

The audible sound from the speaker, caused by the modulation of the carrier, is a close duplicate of the original sound at the transmitter.

(Note.—In many of the diagrams in this section of the Manual, we have intentionally omitted the by-pass condensers in order to make the diagrams clearer. Also note that it is standard engineering practice to measure the plate, screen, and grid voltages of a tube with respect to the cathode terminal in heater-type tubes, and with respect to the negative filament terminal (—F) in plain-filament type tubes. This practice is followed closely in the service manual.)



No 1 R F T.
1R
No 2 R F T
2R
No 3 R F T
D
DET PLATE R F CHOKE
DET —1st A. F COUPLING CONDENSER
1A
2nd A F INPUT TRANSFORMER
2A
QUALITY CONDENSER
BROWN
2nd A F OUTPUT TRANSFORMER
GREEN
BLUE
SHORT ANT
LONG ANT
RED
GROUND
BLACK
GRID CAP
RED WITH WHITE TR
BLUE
BLACK
YELLOW
LOCAL DISTANCE SWITCH
"PHONE" CONDENSER
PRIMARY
SOCKET FOR SPEAKER PLUG
D1
D2
M1
M2
YEL-BLACK-TR.
DET COUPLING RESISTOR BLACK
DET BIAS RESISTOR BLUE
DET BIAS BY PASS
1st A. F. GRID LEAK BLUE
1st A. F. FILTER CONDENSER
1st A. F BIAS RESISTOR
1st A F BIAS BY-PASS
BLACK-WITH-RED-TR.
RED
2Aa
BLACK-WITH-WHITE-TR.
LUG "Z"
R F BIAS RESISTOR
R F BIAS BY-PASS
SCREEN GRID BY-PASS
DET FILTER CONDENSER
DET FILTER RESISTOR BLACK
1st A. F FILTER RESISTOR GRAY
R. F. PLATE CIRCUIT BY-PASS
RED
RED-WITH-BLACK TR
WHITE
LEAD "Y"
VOLUME CONTROL RESISTOR
BLEEDER RESISTOR PURPLE
HIGH VOLTAGE WINDING
FILTER CHOKES
P1
P2
F1
F2
GREEN-WITH-YEL.-TR.
No 1
No. 2
BLUE
WHITE
BLACK-WITH-WHITE-TR
No. 1
No. 2
No 3
FILTER CONDENSERS
ON OFF TOGGLE SWITCH
110 VOLT CABLE
RECTIFIER FIL. WINDING
PILOT LIGHT RESISTOR (RED COVERED)
PILOT LIGHT
2nd A F BIAS RESISTOR No. 2 YELLOW
2nd A F BIAS BY-PASS
2nd A F BIAS RESISTOR No 1 MAROON
1R
2R
D
1A
2Aa
2A
R. F. - DET. - 1st A F FIL WINDING
R F DET 1st A F FIL SHUNT RESISTOR
2nd A F FIL WINDING
2nd A. F FIL. SHUNT RESISTOR

Fig. 15-A. Circuit Diagram of Early Model 55 and 55-C with Transformer Coupled R. F. Amplifier. This circuit has two stages of screen-grid radio-frequency amplification, plate-detection, one stage of resistance-coupled audio-frequency amplification, and a "double audio" output stage. Volume is controlled by changing the screen voltage of both R. F. tubes. An explanation of the action of this circuit is given in the accompanying text.

B. TUNED-R. F. SCREEN-GRID AMPLIFIER

A very small portion of the electro-magnetic energy radiated by the antenna of the broadcast station is intercepted in the antenna circuit of the receiver. It then acts upon the radio-frequency amplifier in the manner described below.

(a) Action of R. F. Amplifier with Transformer Coupling

In the early type of Atwater Kent screen-grid receivers, the R. F. transformers are of the usual inductively-coupled type as shown in Fig. 16. Each of these transformers has a primary winding and a secondary winding.

(b) Action of No. 1 R. F. T.

The electro-magnetic R. F. energy intercepted by the antenna causes an R. F. voltage to be developed in the antenna circuit which causes a current flow through the primary of No. 1 R. F. T.

The current in the primary coil sets up a magnetic R. F. field around the coil. This field "cuts" the turns of the secondary coil and induces a voltage in the secondary. This voltage is greater as the voltage across the primary becomes greater.

If the transformer is not tuned to the frequency of the signal, the voltage across the primary will be small and hence also the secondary voltage will be small.

When the transformer is tuned to the signal frequency, the voltage across both the primary and secondary coils will be a maximum and thus the maximum voltage will be applied to the input of the 1st-R. F. tube.

(c) Action of the 1st-R. F. Tube

The R. F. voltage across the secondary of No. 1 R. F. T. is applied to the grid and cathode of the 1st-R. F. tube. This causes an R. F. variation in the grid voltage of the 1st-R. F. tube.

The varying grid voltage affects the electron-flow between cathode and plate, thus producing variations in the plate-circuit current. These variations in the plate-circuit current are identical in form to the antenna-current variations, but of much greater intensity, owing to the amplifying properties of the 1st-R. F. screen-grid tube.

(d) Coupling Between 1st- and 2nd-R. F. Tubes

The R. F. variations or pulsations in plate-circuit current set up a corresponding R. F. voltage across the primary of No. 2 R. F. T., which is a maximum when the secondary circuit is tuned to the frequency of the pulsations in the primary circuit. The induced R. F. voltage across the secondary of No. 2 R. F. T. is likewise a maximum under this condition.

(e) Action of 2nd-R. F. Tube

The R. F. voltage across the secondary of No. 2 R. F. T. causes a variation in the grid voltage of the 2nd-R. F. tube. The grid-voltage variation affects the cathode-plate electron-flow and produces current variations in the plate circuit of the 2nd-R. F. tube. These pulsations are similar to those in the 1st-R. F. plate circuit, but of much greater intensity, owing to the amplifying properties of the 2nd-R. F. screen-grid tube.

(When a 3rd stage of radio-frequency amplification is used, its action is similar to that of the 2nd-R. F. stage.)

(f) Coupling Between 2nd-R. F. and Detector Tubes

The current-variations or pulsations in the plate circuit of the 2nd-R. F. tube set up an R. F. voltage across the primary of No. 3 R. F. T.

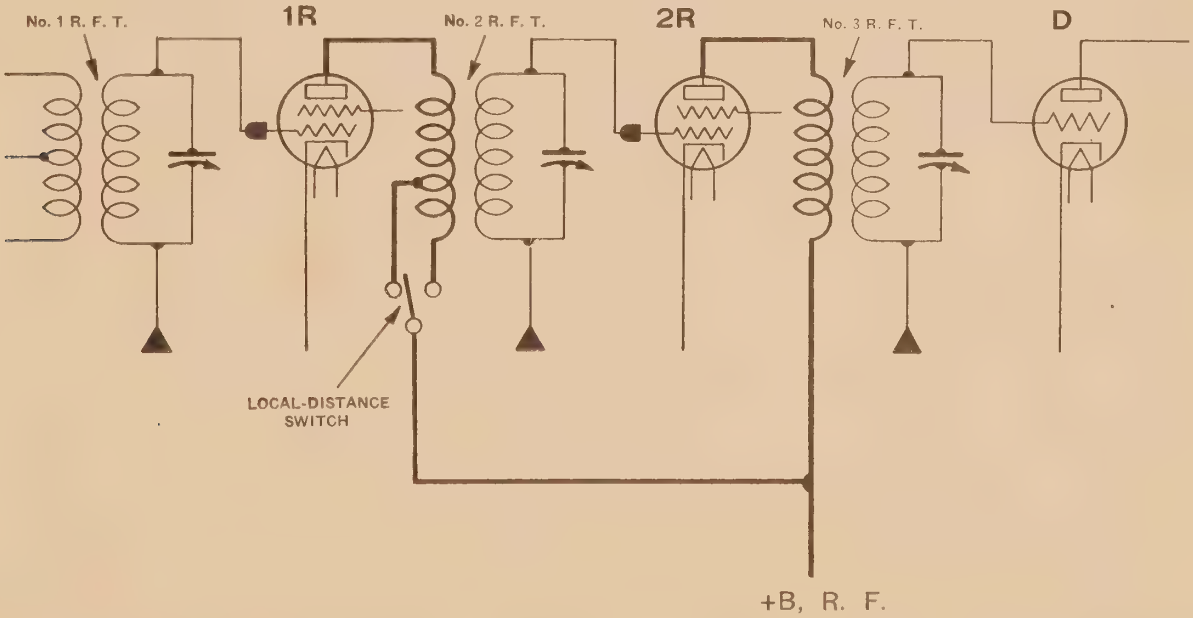


Fig. 16. Elementary Circuit of Radio-Frequency Amplifier Using Two Screen-Grid Tubes with Transformer Coupling.

Tuned-R. F. Screen-Grid Amplifier (Continued)

The R. F. voltage across the secondary of No. 3 R. F. T. is applied to the grid and cathode of the detector tube, as described later.

(g) Prevention of Feed-Back

As mentioned previously, the screen in each R. F. amplifying tube prevents feed-back of R. F. energy from the plate (output) circuit to the grid (input) circuit.

The use of screen-grid tubes, with their high amplification properties in R. F. circuits, combined with correct engineering design of the circuit, results in an extremely sensitive and selective R. F. amplifier.

(h) Action of the Local-Distance Switch (Fig. 16)

The primary of No. 2 R. F. T. is tapped and connected to a "local-distance" switch in such a way that either a part of the primary winding, or the entire primary winding, may be connected in the plate circuit of the 1st-R. F. tube.

By using only a part of the primary, the R. F. voltage which can be built up across this section of the primary is greatly reduced.

When receiving local stations, the switch is turned anti-clockwise so that only a portion of the primary of No. 2 R. F. T. is in use.

This decreases the total R. F. amplification and reduces the possibility of overloading the detector tube when receiving local stations. It also reduces the possibility of distortion which may occur in early-type models when, in order to reduce the volume, the volume control is turned near minimum, thus making the screen-voltage almost zero. However, this condition can be brought about only if the local-distance switch is incorrectly turned to the "distance" position when receiving local or powerful stations.

In later-type models, the screen voltage cannot be reduced below a certain minimum value, thereby eliminating the possibility of the distortion described in the paragraph above.

(i) Action of R. F. Amplifier with Auto-Transformer Coupling

In later-type models the R. F. tubes are coupled with auto-transformers (No. 2 and No. 3 R. F. T.) as shown in Fig. 17.

Each auto-transformer has only one winding and it serves both as the primary and secondary windings of the ordinary two-coil transformer. This winding has a tap at about the center.

A fixed "stopping" condenser is mounted on the outside of the coil form. One terminal of this condenser is connected to the center-tap of the R. F. auto-transformer. The other terminal of the stopping condenser is connected to the plate circuit of the preceding tube, as indicated in Fig. 17.

The stopping condenser permits the R. F. currents in the plate circuit of the tube to flow through the auto-transformer, but it prevents short-circuiting of the plate-voltage supply.

The +B voltage is applied to the plates of the R. F. tubes through R. F. choke coils, R. F. C. No. 1, and R. F. C. No. 2. These chokes permit the flow of steady plate current but prevent the passage of R. F. current-variations, thus forcing them to flow through the auto-transformers.

The action of the auto-transformer circuit is very similar to that of the ordinary R. F. transformer circuit.

The local-distance switch in the auto-transformer coupled R. F. amplifier is arranged differently in order to secure a greater step-down in output volume when switching from the distance to the local position. The step-down of output volume in this case is intentionally designed to be much greater than in the early models.

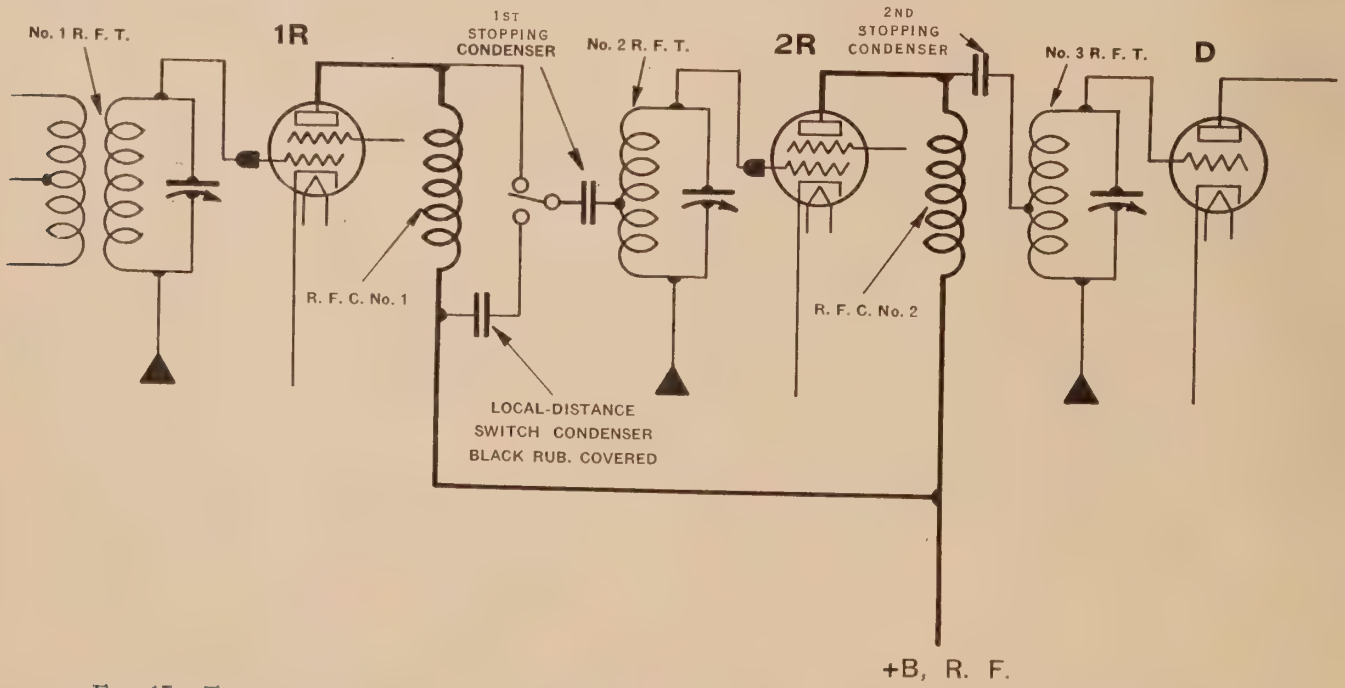


Fig. 17. Elementary Circuit of Two-Stage Screen-Grid Radio-Frequency Amplifier Using Auto-Transformer Coupling.

Tuned-R. F. Screen-Grid Amplifier (Continued)

The connections of the local-distance switch in the auto-transformer coupled R. F. amplifier are shown in Fig. 17.

When the arm of the switch is turned clockwise to make contact with the plate side of R. F. C. No. 1, the plate of the 1st-R. F. tube is coupled to the grid circuit of the 2nd-R. F. tube through the 1st stopping condenser. This provides maximum amplification.

When the switch is turned anti-clockwise to the "local" position, the only coupling between the 1st- and 2nd-R. F. tubes is that provided by the slight capacity between the plate lead from the 1st-R. F. tube, and the lead from the 1st stopping condenser, as both of these leads run to the switch.

The local-distance-switch condenser (formed from two pieces of wire twisted together and covered with soft black rubber tubing) has a capacity approximately equal to that between the plate and screen electrodes and leads of the 1st-R. F. tube.

The local-distance switch condenser acts as a substitute for the plate-screen capacity of the 1st-R. F. tube when the switch is turned from the "distance" to the "local" position. This prevents detuning of the grid circuit of the 2nd-R. F. tube.

C. THE DETECTOR CIRCUIT

A greatly magnified reproduction of the received broadcast energy is delivered by the R. F. amplifier to the grid circuit of the detector tube.

This amplified energy, as previously described, consists of an R. F. alternating voltage which, of course, has positive and negative half cycles.

Each side (positive and negative) of the alternations is modulated, or varied in intensity, at an audio-frequency rate.

(This audio-frequency modulation corresponds to the sound waves of voice or music at the transmitter.)

It is the function of the detector tube to suppress the effects of one side of the R. F. alternations, and allow the A. F. modulation of the remaining side to produce A. F. current variations in the detector plate circuit.

The effects of either the negative or the positive side of the applied R. F. alternations may be suppressed.

There are two main types of three-element vacuum-tube detector circuits which are used to obtain the above results:

(a) **First, the "grid detection" method, using a grid condenser and leak,** as shown in Fig. 18. This method is used in Model 61 and 67. With this circuit, the plate current varies below normal when a signal is being received, indicating that the grid voltage becomes more negative.

The exact explanation of the action of this circuit is rather involved. For our purposes, it is sufficient to know that the grid, being isolated by the grid condenser from direct connection to the cathode circuit (except through the grid leak), accumulates a negative charge when the R. F. voltage variations are applied to the grid condenser. This charge leaks off, at the modulating frequency, through the grid leak, which has a resistance of several million ohms.

The result is that the electron flow between plate and cathode decreases below normal at a radio-frequency rate, and the amount of this decrease varies at an audio-frequency rate, corresponding to the modulation of one side of the applied R. F. voltage alternations in the grid circuit.

The A. F. variation of plate-circuit current sets up an A. F. voltage across the primary of No. 1 A. F. T., which has a high effective resistance (impedance, or opposition) to A. F. current variations. The A. F. voltage across the primary induces an A. F. voltage across the secondary; this A. F. voltage is fed into the audio-frequency amplifier.

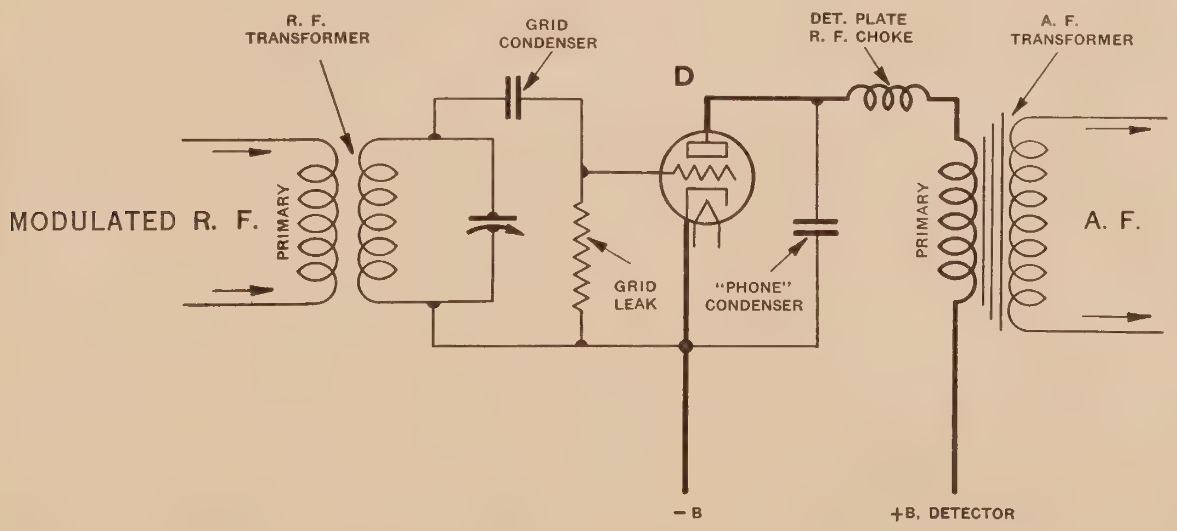


Fig. 18. Circuit of Three-Element Vacuum-Tube Detector Using the Grid-Condenser—Grid-Leak Method of Detection.

The Detector Circuit (Continued)

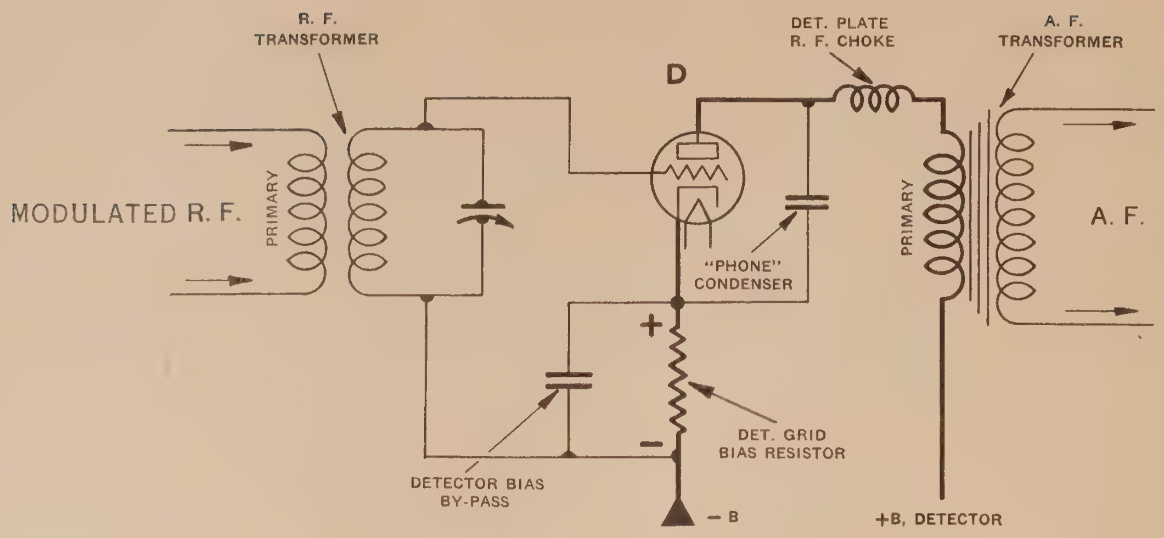


FIG. 19. CIRCUIT OF THREE-ELEMENT DETECTOR USING NEGATIVE BIAS ON GRID.
In the A. C.-operated screen-grid models, resistance coupling is used between the detector plate circuit and the 1st-A. F. grid circuit. However, for the sake of easy comparison with Fig. 18, A. F. transformer coupling is shown above.

(b) **The second method** of detection with a three-element vacuum-tube circuit **is termed "plate detection,"** and it is employed in the A. C.-operated screen-grid models.

In this circuit, Fig. 19, the grid of the tube is maintained at a relatively large negative voltage with respect to the cathode.

Because of this negative grid voltage, the plate-circuit current is extremely low.

When the modulated R. F. voltage supplied by the R. F. amplifier is impressed on the grid bias voltage, it makes the grid voltage alternately more negative and less negative than its normal bias value.

When the grid is more negative than its normal bias, the plate current, being already very low, cannot decrease appreciably.

However, when the grid voltage is less negative than its normal bias, it produces an increase in the plate-circuit current.

In other words, the effect of the negative half-cycles of the applied R. F. voltage alternations is suppressed, and the A. F. modulation of the positive half-cycles produces an A. F. variation in the plate-circuit current.

This A. F. current variation sets up an A. F. voltage across the primary of No. 1 A. F. T. The A. F. output of this transformer feeds the audio amplifier.

(This method of detection may also be described as operating the detector tube on the "bottom bend" of its plate-current—grid-voltage characteristic, at which point an increase of negative voltage on the grid does not decrease the plate current, but a decrease of negative voltage does increase the plate current.)

With this method of detection, the plate-circuit current increases when a signal is received.

D. THE AUDIO-FREQUENCY AMPLIFIER

As its name indicates, the audio-frequency amplifier is used to amplify the audio-frequency (A. F.) output of the detector tube.

The audio amplifier must be so designed that it will not alter the form or shape of the audio-frequency energy delivered to it by the detector tube. If any such alteration does occur, the reproduction will be distorted from its original form.

The amplification must be the same at all audio frequencies, otherwise some frequencies will be submerged, and other frequencies will be exaggerated, resulting in unnatural reproduction.

All Atwater Kent screen-grid receivers (prior to the introduction of the pentode tube in Model 84) have two stages of audio-frequency amplification. The 2nd, or output stage, has two tubes, which make available more than twice the output power of a single tube.

These audio amplifiers, in conjunction with the screen-grid R. F. tubes, have ample reserve power, which, as in the case of a high-powered automobile, is seldom used to its maximum capacity.

The audio-frequency amplifier in the A. C.-operated models is somewhat different from that used in Model 61 and 67. The latter two models are designed to have greater amplification for each audio stage in order to compensate for the necessarily lower plate voltages.

The principal difference between the two audio amplifying systems is in the method of coupling the detector to the 1st-A. F. tube.

In the battery-operated and direct-current receivers, Model 61 and 67, an audio-frequency transformer is used to couple the detector and 1st-A. F. tubes.

In the A. C.-operated models, "resistance coupling" is used between the detector and 1st-A. F. tubes.

A brief explanation of the action of these two methods of coupling is given on the next page.

The Audio-Frequency Amplifier (Continued)

(a) Transformer-Coupled 1st-Audio

In Fig. 19, the A. F. voltage which is set up across the primary of No. 1 A. F. T., as a result of A. F. variations in the detector plate-circuit current, induce a corresponding A. F. voltage across the secondary of No. 1 A. F. T. The voltage across the secondary is greater than the voltage across the primary because the transformer has a step-up ratio, that is, more turns in the secondary than in the primary.

The A. F. voltage across the secondary of No. 1 A. F. T. is impressed on the normal grid bias voltage of the 1st-A. F. tube.

As a result, the grid voltage becomes alternately less negative and more negative than its normal bias value, thus producing corresponding variations in the 1st-A. F. plate-circuit current equally above and below its normal value.

The current variations in the 1st-A. F. plate circuit are exactly similar to the A. F. current variations in the detector plate circuit, but of much greater amplitude or power owing to the amplification provided by No. 1 A. F. T. and the 1st-A. F. tube.

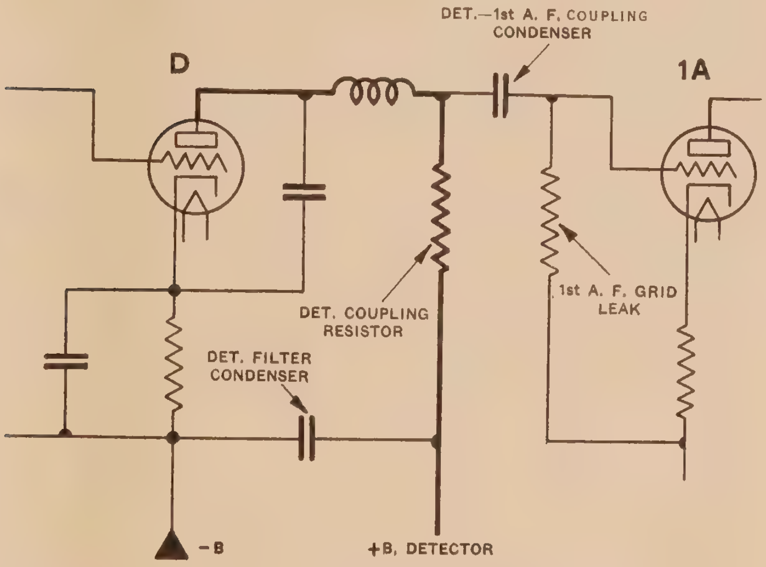


Fig. 20. Diagram Showing Resistance Coupling Between Detector and 1st-A. F. Tubes.

(b) Resistance-Coupled 1st-Audio

Fig. 20 shows resistance coupling between the detector and 1st-A. F. tubes.

In this circuit the grid of the 1st-A. F. tube is connected to the negative end of a bias resistor in its cathode circuit through a grid leak of about one-tenth of a megohm. This leak provides a path for the grid bias voltage to reach the grid, and it also prevents the accumulation of a negative charge on the grid.

The A. F. current variations in the detector plate circuit set up an A. F. voltage across the detector-coupling resistor. This A. F. voltage is fed to the grid of the 1st-A. F. tube through a fixed condenser of large capacity which has low effective resistance to A. F. current variations, but very high effective resistance to D. C.

The A. F. voltage which is fed through the coupling condenser is superimposed on the normal grid bias voltage of the 1st-A. F. tube.

As a result, the grid voltage becomes alternately less negative and more negative than its normal bias value, thus producing corresponding variations in the 1st-A. F. plate-circuit current equally above and below its normal value.

The current variations in the 1st-A. F. plate circuit are exactly similar to the A. F. current variations in the detector plate circuit, but of greater amplitude, owing to the amplification provided by the 1st-A. F. tube.

(c) The "Double-Audio" Output Stage

Except for the method of securing grid, plate, and filament voltages, the action of the double-audio output stage shown in Fig. 26 on Page 27 is typical of all double-audio output stages in Atwater Kent screen-grid receivers.

The A. F. variations in the plate-circuit current of the 1st-A. F. tube produce an A. F. voltage across the primary of the input A. F. transformer. This induces a corresponding A. F. voltage across the secondary.

A tap connection is made to the center of the secondary of the input A. F. transformer. This tap is connected to the negative end of a bias voltage. The positive end of the bias is connected to the filament circuit of the 2nd-A. F. tubes, thus maintaining the grids of both tubes at a negative voltage with respect to their filaments.

The plate of each 2nd-A. F. tube is connected to the primary of an output A. F. transformer. A center-tap on this primary is connected to the positive terminal of a high-voltage D. C. supply.

The A. F. voltage developed across each half of the secondary of the input A. F. transformer is superimposed on its normal grid bias voltage.

This makes the grid voltage of each tube alternately less negative and more negative than its normal bias voltage, and produces corresponding variations in the plate-circuit current of each tube equally above and below its normal value.

When the grid voltage of one 2nd-A. F. tube is becoming more negative, the grid voltage of the other 2nd-A. F. tube is becoming less negative; consequently, the plate-circuit current of one decreases as the plate-circuit current of the other increases.

This produces a co-operating A. F. variation of current through the primary of the output A. F. transformer. As the primary has a high opposition to A. F. current variations, an A. F. voltage is set up across the primary.

This A. F. voltage across the primary of the output transformer is similar in form to the A. F. voltage across the primary of the input A. F. transformer, but of much greater power owing to the amplification provided by the 2nd-A. F. tubes.

The advantages of the double-audio output stage are briefly as follows:

1. The two tubes acting together provide more than twice the available undistorted output power of one tube of the same type.
2. The double-audio output tubes balance out any variation or ripple in their plate-voltage or grid-voltage supply, thus reducing hum. In order to secure this balanced condition it is necessary to use matched tubes.

The Audio-Frequency Amplifier (Continued)

E. The Electro-Dynamic Speaker.

The Atwater Kent electro-dynamic speaker, which is used to convert the electrical output of the audio-frequency amplifier into audible energy, or sound waves, has a practically uniform response to all audio frequencies.

The A. F. voltage across the primary of the output transformer induces an A. F. voltage of much smaller value in the secondary (owing to the step-down ratio of this transformer). This low A. F. voltage is fed into the voice coil of the speaker. The voice coil has low resistance, consequently on a strong signal the A. F. current in the voice coil circuit is comparatively high. The magnetic field produced by flow of current through the voice coil reacts against the constant powerful field of the electro magnet, thus producing motion of the voice coil.

F. A Summary of the Action of the Receiving Circuit

We have now studied the action of the various sections of the receiving circuit, and before beginning to study the power supply system, it may be helpful briefly to review what we have read.

1. **The R. F. amplifier** selects the frequency of one broadcast station, excludes all other stations, and amplifies, without distortion, the energy received from the desired station.
2. **The detector circuit** rectifies the amplified R. F. energy and allows the modulation of this energy to affect the audio-frequency amplifier.
3. **The audio-frequency amplifier** increases the power of the audio-frequency energy delivered by the detector tube.
4. **The electro-dynamic speaker** converts the electrical output of the audio-frequency amplifier into audible energy or sound waves.

THE POWER SUPPLY SYSTEM IN A. C.-OPERATED MODELS

The power supply system must take the 110-volt A. C. (alternating-current) and from it produce high-voltage D. C. (direct-current) for the plate and screen circuits, low-voltage direct-current for the grid circuits, and low-voltage alternating-current for the filament circuits. This is done in this way:

A. The Power Transformer

The 110-volt A. C. supply is fed into the primary of a power transformer (see Fig. 21). There are four secondary windings on this transformer:

(a) The 2nd-A. F. filament winding provides 2.5 volts A. C. for the filaments of the 2nd-A. F. tubes.

(b) The R. F.—detector—1st-A. F. filament winding supplies 2.5 volts A.C. for the filaments of the R. F.—detector—1st-A. F. tubes.

(c) The rectifier filament winding supplies 5 volts A. C. for the filament of the rectifier tube.

(d) The high-voltage winding provides about 350 volts A. C. to each plate of the rectifier tube (measuring from the center tap of the high-voltage winding to each plate of the rectifier).

These values of secondary voltage are obtained by designing the transformer in accordance with a fundamental electrical principle that the ratio of primary voltage to secondary voltage is equal to the ratio of primary turns to secondary turns.

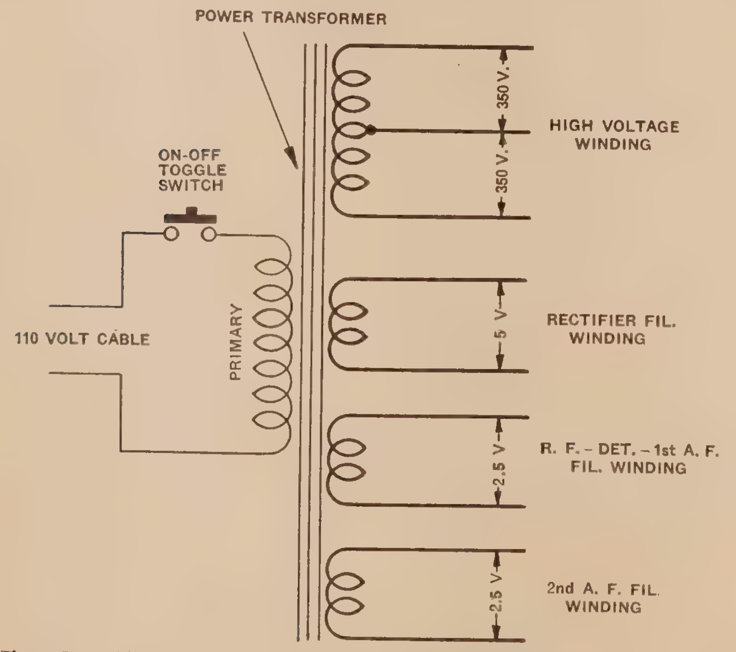


Fig. 21. The Power Transformer Takes 110 Volts A. C. and Transforms it into Higher and Lower Values of Alternating Current as Indicated Above (Early Model 55).

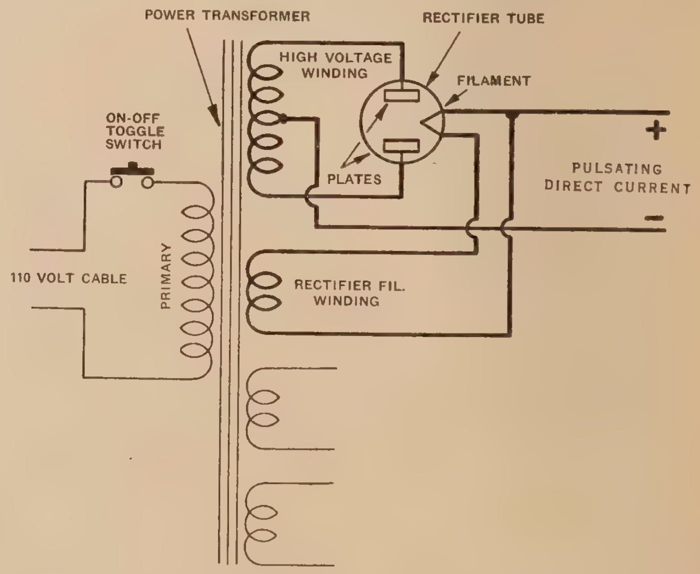


Fig. 22. The High-Voltage A. C. is Converted into Pulsating D. C. by a "Full-Wave" Rectifying Tube, as Shown Above.

The Power Supply System (Continued)

B. Rectifying and Filtering the High-Voltage A. C.

The high-voltage A. C. must be converted into high-voltage D. C. before it can be used to supply the plate, screen, and grid circuits of the receiving tubes. This conversion is accomplished by rectifying the high-voltage A. C. (through use of a "full-wave" rectifying tube), as shown in Fig. 22, and feeding the resultant pulsating D. C. into a filter circuit which delivers a smooth high-voltage direct-current output, similar to that provided by "B" batteries.

The filter circuit, Fig. 23, contains audio-frequency chokes and large filter condensers.

The filter chokes, which are connected in series with the line, offer a high opposition to the alternating current component of the pulsating D. C. which is supplied by the rectifier tube. The chokes therefore tend to prevent passage of the pulsations in current, but offer only slight resistance to the direct-current portion of the current.

The filter condensers, connected across the supply lines, have low effective resistance to the A. C. component of the pulsating D. C. which is supplied by the rectifier tube. The filter condensers therefore tend to short-circuit the pulsations in the current, but as the condensers have a very high opposition to D. C., they do not affect the D. C. component of the pulsating D. C. supply.

The result of the action of the filter circuit is that the pulsations (in the direct-current furnished by the rectifier tube) are smoothed out, and after passing through the filter circuit, the current is practically pure D. C., and hence will not introduce any hum in the receiver. See Fig. 27 on Page 28.

(The detector and 1st-A. F. plate circuits have separate additional audio-frequency filters, comprising a filter resistor and filter condenser, which serve to prevent undesired reaction between the plate currents, which reaction has a tendency to occur owing to the coupling provided by the common supply.)

C. DISTRIBUTING THE HIGH-VOLTAGE D. C. TO MEET THE REQUIREMENTS OF THE RECEIVING TUBES

After the high-voltage A. C. has been rectified and filtered into pure D. C., it is distributed among the tubes in such a way as to meet the voltage requirements of each tube.

(a) Feeding the Plate Circuits

In order to understand how the correct voltages are applied to each tube, it is helpful to study the circuit of early Model 55 in Fig 15-A, and note that the negative line of the filter circuit goes through the speaker field coil to the chassis. Also, by tracing out the plate circuit of each tube, and the screen circuit of each R. F. tube, it will be found that these are all fed from the positive line of the filter circuit.

After entering the plate or screen circuit, how does the current get back to the negative side of the filter circuit?

The return path for each plate and screen circuit is across the electron-stream between plate and cathode, or screen and cathode, then through the bias resistor for that tube and back to the negative line (chassis) of the filter circuit.

(In the 2nd-A. F. tubes, the return path of the plate circuit is somewhat different, as will be described later.)

(b) How Grid Bias is Obtained

The plate current of each tube, or the plate and screen current of each R. F. tube, flows through the bias resistor.

This current produces a voltage across the bias resistor and, if the grid return of the tube is connected to the negative end of the resistor, the grid will be held at a negative voltage with respect to the cathode.

This voltage (across the bias resistor) constitutes the grid bias for the particular tube. The value of the bias voltage is governed by the resistance of the bias resistor, and by the value of the total current flowing through the bias resistor.

This may be understood more readily by studying Fig. 24 which shows the complete plate circuit of an R. F. tube. Here, as indicated by arrows, the current flows from the positive side of the filter circuit through the primary of the R. F. transformer, across the plate-

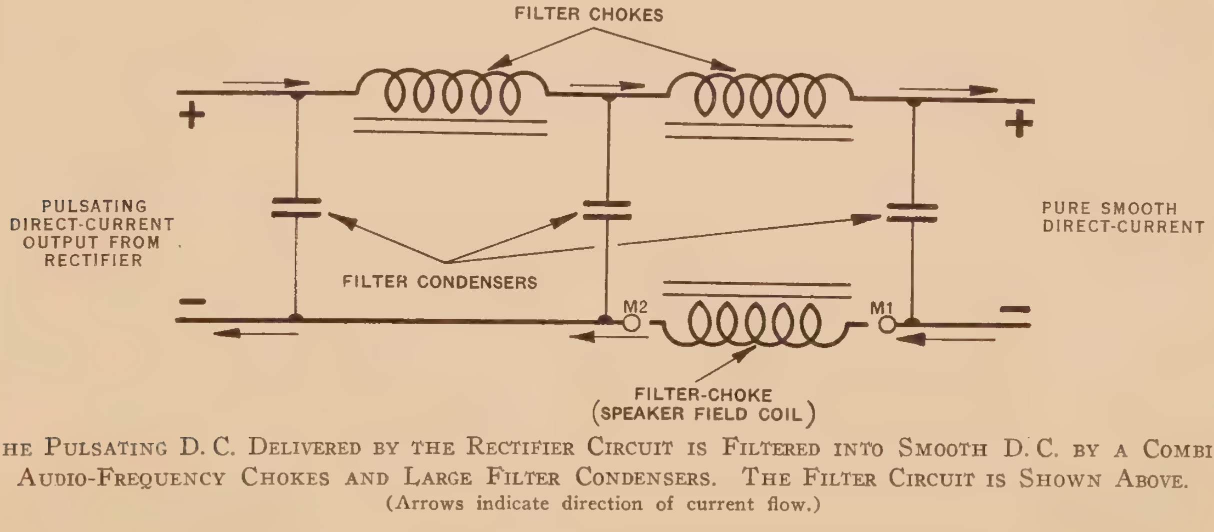

FILTER CHOKES
+
+
PULSATING DIRECT-CURRENT OUTPUT FROM RECTIFIER
PURE SMOOTH DIRECT-CURRENT
FILTER CONDENSERS
−
−
M2
M1
FILTER-CHOKE (SPEAKER FIELD COIL)

Fig. 23. The Pulsating D. C. Delivered by the Rectifier Circuit is Filtered into Smooth D. C. by a Combination of Audio-Frequency Chokes and Large Filter Condensers. The Filter Circuit is Shown Above.
(Arrows indicate direction of current flow.)

The Power Supply System (Continued)

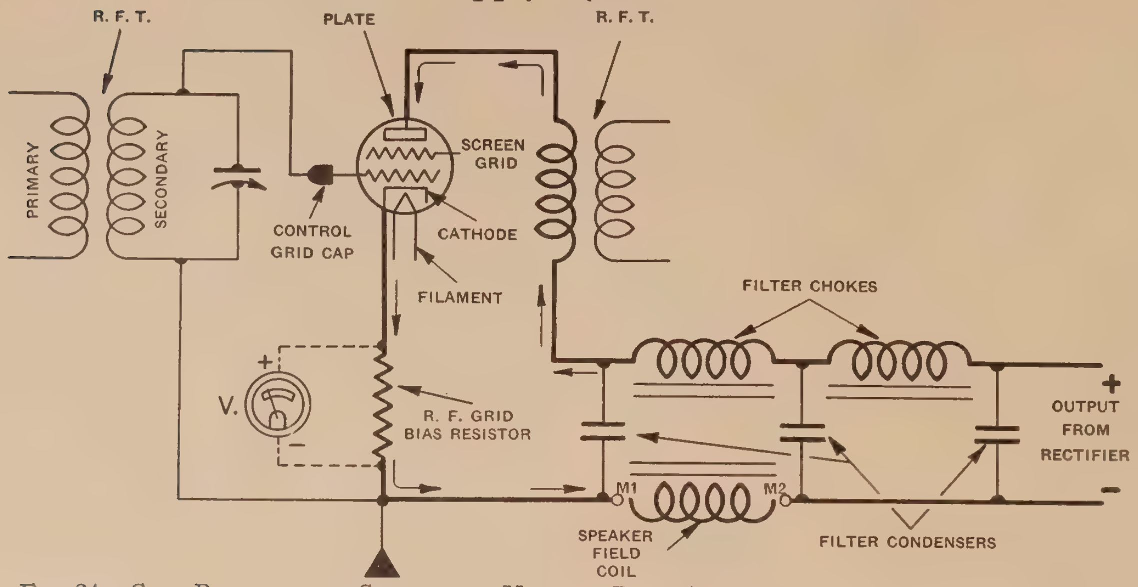

R. F. T.
PLATE
R. F. T.
PRIMARY
SECONDARY
SCREEN GRID
CONTROL GRID CAP
CATHODE
FILAMENT
FILTER CHOKES
V.
+
-
R. F. GRID BIAS RESISTOR
+
OUTPUT FROM RECTIFIER
-
M1
M2
SPEAKER FIELD COIL
FILTER CONDENSERS

Fig. 24. Grid Bias may be Secured by Voltage Drop Across a Bias Resistor Connected Between Cathode and —B.

The plate-circuit current, flowing through the bias resistor, as indicated by arrows, causes a voltage drop across the resistor, thus making the cathode positive with respect to the grid-return lead, and therefore making the grid negative with respect to the cathode.

cathode electron path, through the bias resistor, and back to the negative side of the filter circuit.

The grid-return of the tube is through the secondary of the left-hand R. F. T. and thence to the negative end of the bias resistor. The voltage across the bias resistor (measured with a high-resistance D. C. voltmeter "V"), which is produced by the flow of plate and screen current, serves to make the grid negative with respect to the cathode.

(c) Measuring the Grid Bias

In actual measurement of the grid bias, we recommend measuring from the grid of the tube to the cathode, as shown in Fig. 25, in order to check the continuity of the grid circuit and measure the bias in one operation. However, in doing this, if the grid return path or the bias resistor has a high resistance in proportion to the resistance of the voltmeter, the measured voltage will be less than the voltage across the bias resistor. This is true when measuring the 1st-A. F. and the detector grid voltages in the A. C.-operated screen-grid models. In the voltage tables for these models we give the detector and 1st-A. F. grid voltages as measured from grid to cathode with the 0-50 scale of a one-thousand-ohm-per-volt meter. The actual normal bias voltage is higher.

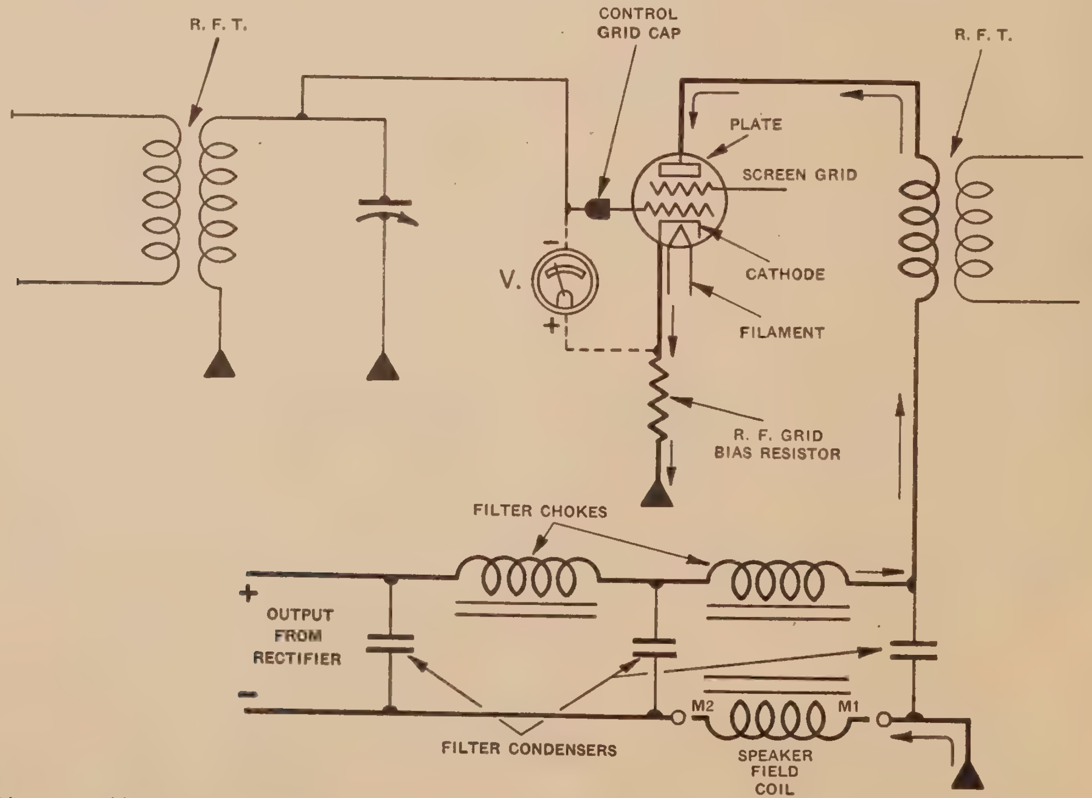

R. F. T.
CONTROL GRID CAP
R. F. T.
PLATE
SCREEN GRID
V.
+
CATHODE
FILAMENT
R. F. GRID BIAS RESISTOR
FILTER CHOKES
+
OUTPUT FROM RECTIFIER
-
FILTER CONDENSERS
M2
M1
SPEAKER FIELD COIL

Fig. 25. This is the Same Circuit as Fig. 24, but it Appears Different Because the Grid-Return, Cathode, and —B, Chassis Connections are Shown Separately.

The Power Supply System (Continued)

(d) Tracing the Bias Circuit

In the complete diagram of early Model 55, Fig 15-A, it is not as easy to trace out the complete plate-circuit path of each tube, as it is in Fig. 24. This is caused by the fact that in a desire to make the complete diagram (Fig. 15-A) follow the actual wiring of the set, so it will be most helpful in service work, we have shown separate chassis connections for the grid circuits, cathode circuits, and negative end of the main filter circuit.

This may be appreciated by comparing Figs. 24 and 25, which are identically the same electrically, but appear different because in Fig. 24 there is one chassis connection for all the circuits, while in Fig. 25 the chassis connections are shown separately.

(e) How Grid Bias is Obtained for 2nd-A. F. Tubes

The grid bias for the 2nd-A. F. tubes could be secured by connecting the filaments of these tubes to the negative end of the filter circuit through a suitable resistor, and connecting the grid return (center-tap of the secondary of the 2nd-A. F. in-put transformer) to the negative end of this resistor.

However, as the 2nd-A. F. bias voltage must be about 45 volts for the 245 tubes, and about 80 volts for the 250 tubes, it would not be economical to use this high voltage (which is subtracted from the total voltage available for the plates of the 2nd-A. F. tubes) merely for biasing the 2nd-A. F. tubes.

Therefore, a different method is used, as shown in Fig. 26. Here the speaker field coil is used as a filter choke and is connected in the negative line of the filter circuit. The field coil has resistance, and, as the D. C. currents of all plate and screen circuits flow through the negative line of the filter circuit, and therefore through the field coil, there is a D. C. voltage across this coil.

In Model 66, the voltage across the field coil is about 80 volts. Therefore, by connecting the filament circuit of the 2nd-A. F. tubes to the positive side (chassis) of the field coil, and connecting the grid return of the 2nd-A. F. tubes to the negative end of the coil, the grids of the 2nd-A. F. tubes are maintained at 80 volts negative with respect to their filaments.

The connection to the filament circuit is made through the center-tap of a filament-shunt resistor for the reason explained previously.

In the A. C.-operated models which employ 245 and 171-A tubes, requiring a grid bias of about 45 volts, a similar biasing system is used, but instead of using the entire voltage across the field coil, a potentiometer arrangement of resistors is connected across the field coil so that the correct portion of the total voltage is available for grid bias of the 2nd-A. F. tubes. This is shown in the diagram of early Model 55, Fig. 15-A, and also in Fig. 27.

Because of this careful engineering design, the speaker field coil serves three purposes:

1. It acts as a filter choke, thus helping to smooth out the plate-voltage supply.
2. The D. C. voltage across the field coil is used in whole or in part to bias the grids of the 2nd-A. F. tubes.
3. The total plate current of the tubes, flowing through the field coil, produces a strong magnetic field in the circular air-gap of the speaker magnet.

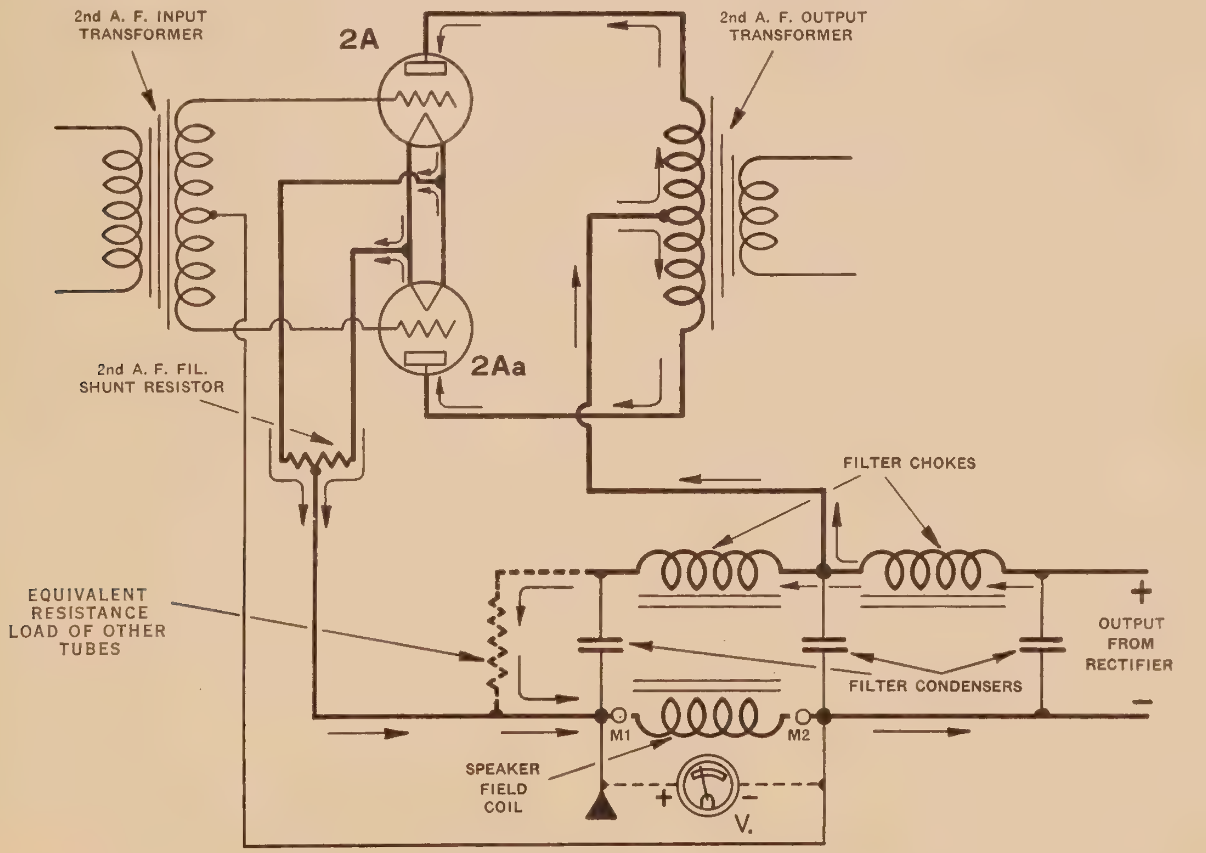

2nd A. F. INPUT TRANSFORMER
2A
2nd A. F. OUTPUT TRANSFORMER
2Aa
2nd A. F. FIL. SHUNT RESISTOR
FILTER CHOKES
EQUIVALENT RESISTANCE LOAD OF OTHER TUBES
+
OUTPUT FROM RECTIFIER
FILTER CONDENSERS
−
M1
M2
SPEAKER FIELD COIL
+
−
V.

Fig. 26. The 2nd-A. F. Bias Voltage in Model 66 is Obtained by the Drop Across the Speaker-Field Coil in the Negative Side of the Filter Circuit.

The filament circuit of the 2nd-A. F. tubes is connected to the positive side (chassis) of the field coil, and the grid-return (center-tap of the secondary of the input A. F. transformer) is connected to the negative side of the field coil. The bias voltage is measured with a high-resistance D. C. voltmeter "V."

The above diagram does not show the grid-filter resistor and condenser which are used in Model 66.

The Power Supply System (Continued)

(f) How the Screen-Grid Voltage is Controlled

The sensitivity of the R. F. amplifier, and consequently the output volume of the set, may be controlled by regulating the screen voltage.

When the screen voltage is adjusted to its maximum value, the R. F. amplifier has greatest sensitivity and amplification. Both of these factors decrease as the screen voltage is decreased.

For engineering and production reasons the circuit arrangement for securing the correct screen voltage varies in different models, and also in different types of the same model. The arrangement used in Model 55 and 55-C is shown in Figs. 28 and 29.

(g) The Complete D. C. Distributing System

Having now reviewed the rectifying and filtering circuit, and having described how the plate, grid, and screen voltages are obtained, it will prove helpful to study Fig. 27, which shows the complete D. C. distributing system for later Model 55.

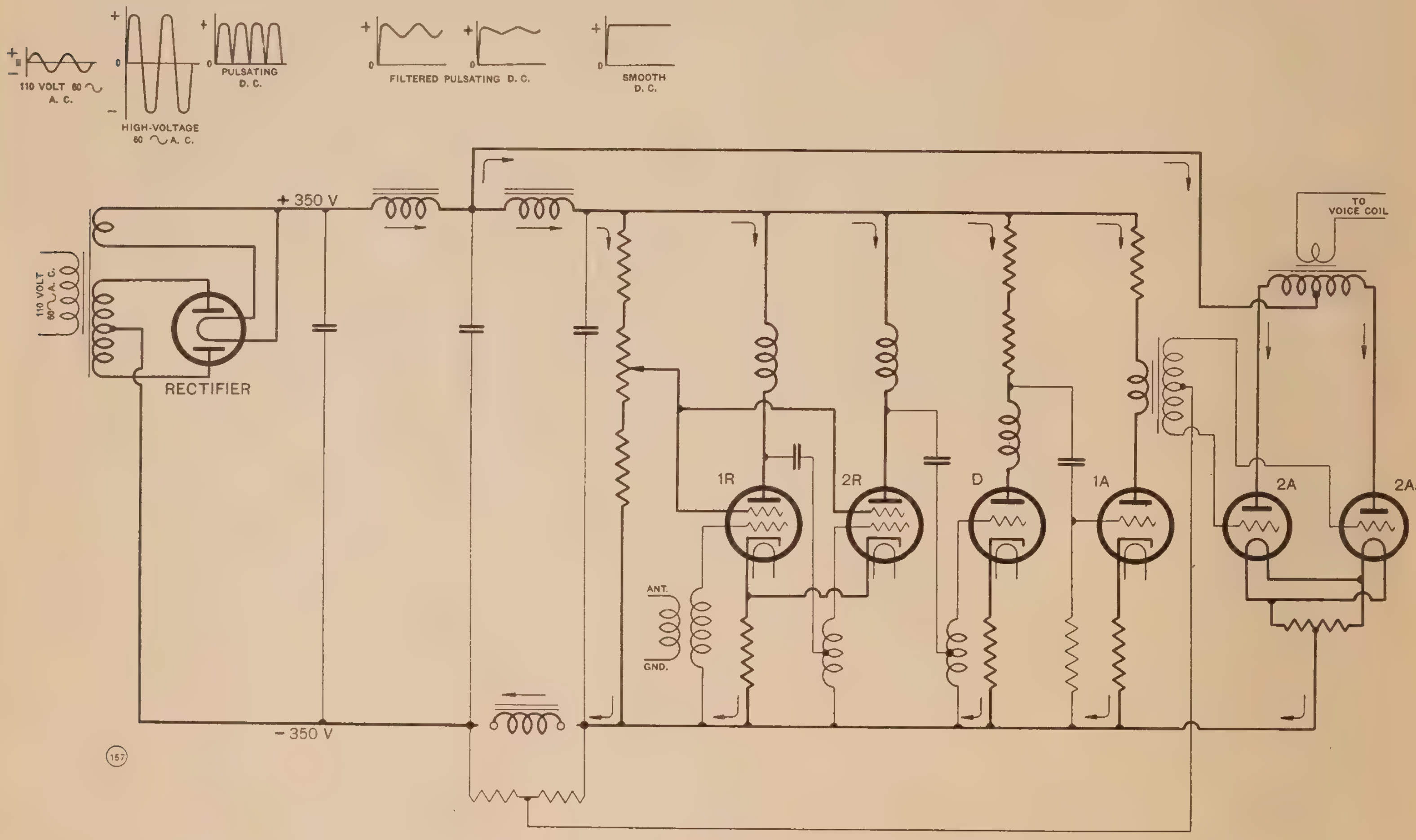

110 VOLT 60 ∿ A. C.
HIGH-VOLTAGE 60 ∿ A. C.
PULSATING D. C.
FILTERED PULSATING D. C.
SMOOTH D. C.
+ 350 V
110 VOLT 60 ∿ A. C.
RECTIFIER
- 350 V
157
TO VOICE COIL
1R
2R
D
1A
2A
2Aa
ANT.
GND.

FIG. 27. D. C. DISTRIBUTING SYSTEM OF LATER 55 AND 55-C.

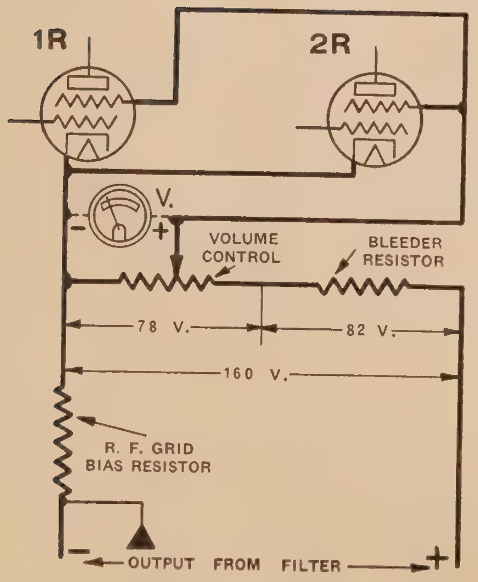
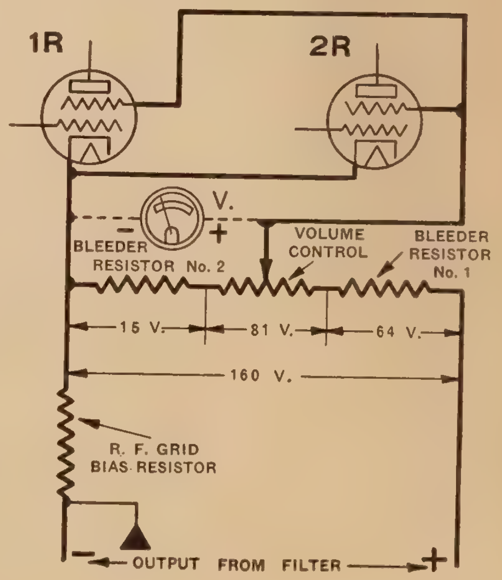

1R
2R
V.
VOLUME CONTROL
BLEEDER RESISTOR
78 V.
82 V.
160 V.
R. F. GRID BIAS RESISTOR
OUTPUT FROM FILTER

FIG. 28. IN EARLY MODEL 55 AND 55-C, THE SCREEN VOLTAGE IS ADJUSTABLE FROM ZERO TO ABOUT 78 VOLTS, AS SHOWN AT LEFT.

FIG. 29. IN LATER MODEL 55 AND 55-C, THE SCREEN VOLTAGE IS ADJUSTABLE FROM ABOUT 15 TO 96 VOLTS, AS SHOWN AT RIGHT.

The screen voltage is measured with a high-resistance D. C. voltmeter "V."


1R
2R
V.
BLEEDER RESISTOR No. 2
VOLUME CONTROL
BLEEDER RESISTOR No. 1
15 V.
81 V.
64 V.
160 V.
R. F. GRID BIAS RESISTOR
OUTPUT FROM FILTER

IMPORTANT FACTS THE ATWATER KENT DEALER SHOULD KNOW

1. Replacing R. F. Transformers.

Atwater Kent dealers should keep constantly in mind this fact:

Single R. F. transformers are not sold separately.

When a single R. F. transformer in a set becomes burned out or damaged, it is necessary to replace the entire R. F. transformer group or assembly. This is due to the fact that these coils are matched in groups at the factory and sold from the factory in complete groups only.

If you do not have a replacement group in stock, return the group containing the damaged coil or coils to your distributor who will exchange it for a new group and charge you only for the coil or coils needing replacement. Refer to parts list for prices of replacements on each type of set.

2. Replacing Coils in Magnetic Speakers.

Coils for magnetic (horn or cone) type speakers are not sold separately.

This is due to the fact that when a new coil is installed it is necessary to remagnetize the poles which can only be done at the factory. When you have a speaker unit with burned out coil, return the unit to the distributor who will replace it and charge you only for the burned out coil plus a small labor charge.

3. Replacing Carbon-Type Volume Controls.

Parts for carbon-type volume controls (used in later screen-grid sets) are not sold separately.

Owing to the fact that special tools are required for assembling carbon-type volume controls, parts for this type control are not furnished separately. When one of these controls develops trouble, return it to your distributor for replacement at a charge for labor and material involved.

4. Operating 25-Cycle Sets on 60-Cycle Current.

A receiver designed for 25-cycle operation will function satisfactorily on 25-, 40- or 60-cycle current. However, a 60-cycle set must not be operated on 25-cycle or 40-cycle current, otherwise overheating and damage will result.

5. Converting D. C. Sets to A. C. and Vice-Versa.

The dealer may frequently be confronted with the question as to the possibility of changing over a D. C. set for use on A. C. or vice-versa. The cost of making any such change would be entirely prohibitive, consequently the only solution in a case of this kind (where the current is changed or customer moves to a location where current is different) is a trade-in for a model using the current called for. If the dealer can not handle the exchange himself he should take the matter up with his distributor. One exception to this may be mentioned in the case of an A. C. set which may be operated from a D. C. line by using a small motor generator—these can be purchased for as low as $50.00.

6. Operating a Radio on a 32-volt D. C. Lighting System.

Probably the most economical method of utilizing the 32-volt farm lighting system for radio is to use a standard A. C.-type receiver in connection with a small motor generator, designed to operate on 32-volts D. C. and deliver 110 volts A. C. There are several such generators available at reasonable prices.

A 6-volt battery-type receiver may be operated on 32 volts by using a suitable resistor (several commercial types are available) in series with the line, to reduce the voltage to that required for the filaments of the tubes. Resistors equipped with automatic cut-out to prevent overload are available.

The 32-volt system cannot be utilized to supply the plate or "B" voltage to a battery-type set. This must be supplied by dry "B" batteries. Storage "B" batteries which can be recharged (in sections) from the 32-volt system are also available.

7. Use of the Electro-Dynamic Speaker on Early-Type Sets.

We do not advise attempting to use an electro-dynamic speaker with our earlier type sets designed primarily for the use of a magnetic speaker. The dealer is advised to endeavor to sell the customer a complete new receiver in such cases, explaining to the customer the advantage of having an outfit in which the set and speaker were designed by the factory, to work together to give maximum performance.

8. Use of Screen-Grid Tubes in Early Models.

It is frequently asked if it is practical or advantageous to use screen-grid tubes in the early type electric or battery receivers which were manufactured before the screen-grid tubes were developed.

The answer to this question is that a receiver must be especially designed in order to use screen-grid tubes; owing to the peculiar nature of these tubes and their extreme sensitivity, they will not give best results in an ordinary tuned R. F. circuit of the early type. It can therefore be readily seen that it would be impractical to re-design an old set to permit using these tubes, owing to the expense and complications involved.

Here again the dealer is advised to urge the customer to trade-in his old set as part payment on an up-to-date model.

9. Adding Extra Speakers or Headphones to Various Atwater Kent Receivers.

Very often it is desired to use one or more additional speakers or headphones in other rooms, etc., the extra speakers being connected so that they can be switched on or off independently of the regular or original speaker. The method used for making connections of the additional speakers depends upon the type of set. An outline follows:

(1) *Magnetic Sets.*

One or several additional magnetic or inductor-type JB speakers or headphones may be used by simply connecting in parallel with the original speaker; that is, simply run leads from the output or speaker posts of the set to the additional speakers at their locations.

If more than two or three additional speakers are used a series-parallel connection is advisable. Headphones may be used in place of speakers if a suitable resistor is connected in series with one lead to regulate the volume.

A single-pole—single-throw switch in one lead to each extra speaker will permit it to be turned on at will.

Important Facts (Continued)

(2) *Early Electro-Dynamic Sets, Model 43, 46, 47 and 53.*

A small number of additional magnetic or inductor-type JB speakers or headphones may be used by making connection to the two terminals at the right-hand end of the rear row of terminals on top of the power unit. Simply solder two leads to these two terminals and bring the leads out through cover of set to the common leads of the additional speakers.

(3) *Screen-Grid Sets, Model 55, 60 or 66.*

In cases where more than one additional speaker or headphone are desired, we suggest the use of the special tapped output transformer (No. 15930), which we designed for this purpose. This transformer is simply substituted for the regular output transformer in the set and connection of the group of additional speakers made to whichever two of the five taps on the special transformer give the best results.

With this arrangement Model 55, 60 or 66 will handle up to 15 or 20 additional magnetic or inductor-type JB speakers satisfactorily.

We do not advise the use of additional electro-dynamic speakers, owing to the expense and difficulty of supplying direct current for the fields.

Where only one additional speaker or headphone is desired, we suggest an arrangement as shown in the illustration, which consists of tapping off the voice coil leads of the speaker cable, with a step-up transformer and connecting the extra speaker across half the secondary winding of this transformer. The use of switches so that either the regular or extra speaker may be cut out at will, is shown.

(4) *Model 67 Screen-Grid Battery-Type Receiver and Model 61 D. C. Receiver.*

A few extra magnetic or inductor-type JB speakers or sets of headphones may be used with these sets by running leads to them from the plates of the output tubes (171A) in the set.

(5) *1931 Models: Type L, F and P Chassis.*

The only satisfactory method of connecting additional magnetic or inductor-type JB speakers or headphones to these sets is by the use of our special output transformer, No. 17790, which is to be substituted for the regular transformer attached to the type N speaker. This special transformer is provided with 5 taps to permit best results with different numbers of speakers, up to 15 or 20 being practical. A connection is also provided in the transformer whereby the electro-dynamic speaker on the set may be shut off if desired.

(6) *1931 Models: Type D (D. C.) and Q (battery) Chassis.*

A few extra speakers or headphones may be used with these sets by making connection to the plates of the output (171A) tubes.

(7) *Model 84.*

No provision has been made for the use of additional speakers with this model; extra electro-dynamic speakers for this set are not sold separately.

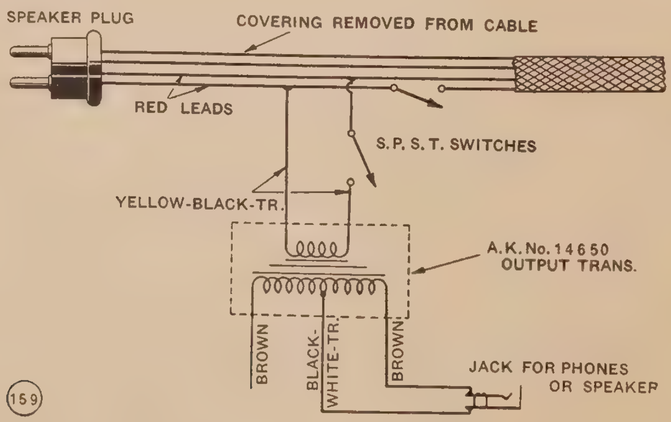


FIG. 32. CIRCUIT ARRANGEMENT FOR ADDING AN EXTRA SPEAKER TO MODEL 55, 60 OR 66.

SERVICE NOTES FOR SCREEN-GRID RECEIVERS

A. Replacing R. F. Transformers and Variable Condensers:

As in the other Atwater Kent single-dial receivers, if one R. F. transformer is defective or damaged, the entire group must be replaced. Likewise if one variable condenser is defective, all of the variable condensers must be replaced. Single R. F. coils or variable condensers are not furnished.

B. Replacing Eyeletted Parts:

The tube sockets, identifying plates and tube-shield bases are fastened with eyelets to the base-plate, and several parts are eyeletted to the main panel, but if any of these parts requires replacement, it may be removed by cutting out the eyelets, and the replacement part may then be mounted in position with short 6/32 or 8/32 screws and nuts.

C. Synchronizing Condensers:

When synchronizing the condensers, connect the oscillator pick-up lead to the Short-Antenna post, and place the local-distance switch in the "distance" position.

The bottom-plate should be screwed in position when testing any of the screen-grid models for output volume, or when synchronizing the condensers. However, in order to avoid the necessity of removing and replacing this plate a number of times, it will be found more convenient to cover the top of the test bench with a sheet of tin (about 20 gauge), which should be connected to ground. This sheet of metal acts as a shield in place of the bottom-plate.

In Model 61, the chassis must not be connected to ground, so in this case the ground connection to the sheet of tin should be opened. When testing both A. C. and D. C. receivers, an on-off toggle switch may be connected in the ground lead to the tin sheet. This switch should be opened when testing the screen-grid direct-current receivers.

D. Use Top Plate:

Owing to the design of the R. F. amplifying circuit in the screen-grid receivers, it is necessary to use a top shielding-plate when synchronizing the variable condensers. In the shield for three-condenser receivers, such as Model 55, it is necessary to cut a hole in the shield over the rotor of No. 1 condenser in order to make this rotor accessible for adjustment. This hole should be about 1½ inches in diameter with its center 2¼ inches from the left edge of the shield and about 1⅜ inches from the front edge. The rotor of No. 1 condenser may then be adjusted with one finger through this hole. No. 2 condenser rotor may be adjusted by turning the control knob, and No. 3 rotor may be reached from the right-hand side of the chassis.

In four-condenser screen-grid receivers, such as Model 60, a 1½ inch hole should be drilled in the shield over the rotors of No. 1, No. 3 and No. 4 condensers.

A top shield for the three-condenser type receivers, and a top shield for the four-condenser type receivers, with holes cut as mentioned above, should be available at each testing bench. These specially-drilled shields are NOT supplied from the factory.

E. Operating-Voltage Measurements:

One of the quickest methods of testing the screen-grid receivers is by measuring the voltage at each tube socket as indicated in the tables for each set. **Please note that the voltage values are approximate only.** These measurements must be made while the set is in operation, using either a commercial set-analyzer, with adapters which fit into the tube sockets, or using separate A. C. and D. C. voltmeters, making connection to the tube socket-contacts under the base plate. All of the socket-contacts may be exposed by inverting the set and removing the flat bottom-plate.

F. Continuity Testing:

Separate parts may be tested for continuity with a voltmeter and battery in the usual way. If there is any doubt as to whether a part is shorted, grounded, or open, it is advisable to remove all connecting leads to that part and test it separately.

When making continuity tests, see that the control-grid leads do not touch the chassis.

G. Antenna:

Two antenna posts are provided on the set, marked "Long Antenna" and "Short Antenna." The Long-Antenna post gives somewhat greater selectivity.

Indoor aerials for the screen-grid receivers should be erected as far as possible away from grounded metal, such as pipes, steel beams, electric wiring, etc. **A good outside antenna is recommended in preference to an indoor antenna.**

H. Ground:

It is necessary to use a good ground connection. In some cases, depending on the installation conditions, the sets will work satisfactorily without a ground, but for best results we strongly advise the use of a good ground connection.

I. Output Tubes:

The two A. F. output tubes (2A and 2Aa) should be matched on a tube tester, otherwise the set may hum.

The speaker-plug must not be removed from its socket while the set is in operation.

J. Local-Distance Switch:

The set should be operated with the local-distance switch in the local position when receiving near-by stations. Failure to do this may result in distortion when receiving near-by stations. This use of the local-distance switch should be explained to owners, in order to avoid unnecessary discussion.

K. Phonograph Adaptors:

Owing to the fact that resistance coupling is used between the detector and the 1st audio stage on Model 55, 55-F, 60 and 66, the usual type of phonograph pick-up may not give satisfactory volume on these receivers. However, some manufacturers have special pick-ups for these models.

PLANNING THE SERVICE DEPARTMENT

1. The Service Room

The first thought of the dealer, once he has been "sold on the idea" of rendering real service, will be a suitable workshop or service room in which to carry on this work, and also the tools and equipment he will require to perform radio service completely and efficiently.

In most cases it will be necessary for the dealer to utilize for his service room whatever location may be available for this purpose under the conditions of his present floor layout, but where there is a choice, or in case of the occupying of new quarters where any desired layout can be planned, it is suggested that the service and parts stock room be arranged adjoining or convenient to the rear of the sales and display room. With this arrangement, customers bringing sets in for service can be referred promptly to the "Service Department," which will avoid unnecessary delay and interference with the work of the floor salesman. The dealer's "outside service man" can, of course, enter the shop by the rear entrance.

The service room need not be very large, but should be well lighted. If possible to have outside light directly on the service bench or table from one side or the rear, it will enable the service man to work more efficiently and consequently to produce better results.

2. The Repair Bench

The service bench or "repair table" should be four or five feet long and about twenty inches deep. The height should be about thirty-six inches, so as to permit the repairman to work at it conveniently while standing. The top of the table should be of fairly heavy pine wood, and the legs should be heavy enough to insure the bench being absolutely firm and free from vibration. One or two round-topped stools can be provided for the men when working on jobs requiring considerable time.

3. Suggestions for Service Equipment

A reasonably complete outfit of meters and tools, which will cover the making of any ordinary tests and repairs, is suggested as an initial equipment for the dealer's service room, and consists of the following:

Voltmeter panel (see Page 39 for description).

Multi-wave oscillator covering the broadcast range and also 130 K. C.

Milliameter, 0-100 M. A.

A separate continuity testing meter or "ohmmeter."

Tube testing device (any standard make).

Hydrometer.

Soldering iron and equipment.

Testing prongs with cables (several pair).

Set of small open-end hex. wrenches.

Set of small socket type hex. wrenches.

Open end wrench for toggle switch (for ⅝-inch hex. nut).

Assortment of screw drivers, pliers and wire cutters.

Assortment of spring type clips for quick connections.

Assortment of small fuses (1 and 2 Amp. and 100 M. A.)

Pair of special wrenches for removing cone of E speaker (Part No. 9255).

Jig for setting volume-control contact (Part No. 15115).

Set of three shims for centering the voice coil in electro-dynamic speakers (Part No. 20171).

Three gauges for centering top-pole-piece in electro-dynamic speakers. Each gauge consists of a three-inch length of No. 54 drill rod.

Two specially-drilled top plates for use in synchronizing condensers in screen-grid receivers. See Page 31 for details.

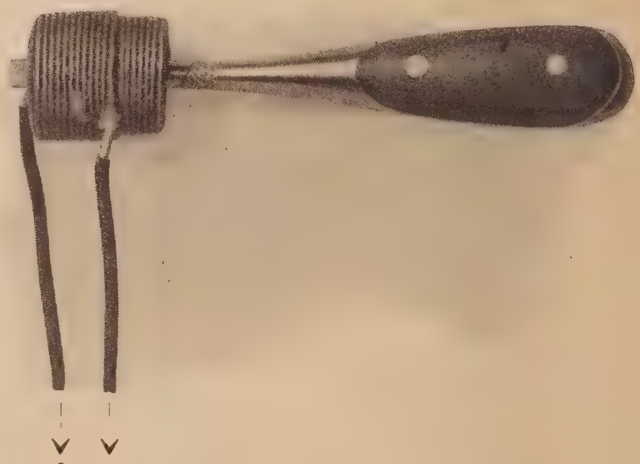


FIG. 33. MAGNETIZING A SCREW DRIVER.

A magnetized screw driver is of great assistance in removing and inserting screws in places which are ordinarily difficult to get at, and it is suggested the dealer prepare one. To magnetize a screw driver, simply insert the blade inside a coil about 50 turns of No. 18 or other insulated wire, the terminals of which are connected to a 6-volt battery and close the circuit for a moment.

4. Arranging the Equipment

All tools frequently used should be kept in a definite place where they will be accessible without delay. A row of hooks at one end of the work table or on the wall can be recommended for this.

The testing equipment may be arranged as shown on Page 38.

Planning the Service Department (Continued)

5. Locating Repair Parts Stock and Repair Material

The best method of arranging the stock of repair parts is to keep them in rows of small wooden bins or in glass jars on sets of shelves on the wall. Each bin or jar should be carefully labeled with the part number and name.

It will also be advisable to have an additional set of shelves for complete sets and speakers—for example a shelf for jobs "to be repaired," one for sets "ready for delivery," and one for sets "awaiting instructions" from the owner or waiting for parts which have been ordered.

6. Equipment for the Outside Service Man

The amount and type of equipment provided for the dealer's "outside service man" will depend on the total investment being made in service equipment, and the ability of the outside man in using meters, etc., to locate and perhaps repair minor troubles in the customer's home.

As a rule it is preferable to make only the external tests in the customer's home, and if trouble is found to be within the set or speaker they can be loaded into the service truck and brought to the shop. This avoids the bad psychological effect of making an actual set repair in the presence of the owner.

There are several complete set testing outfits or "analyzers" on the market made by reliable companies, ranging in price from $50.00 to $200.00 or more (retail price). These include all necessary voltmeters, ammeters, tube testers and, in some cases, an oscillator for use in synchronizing variable condensers.

If the dealer does not feel able to invest in one of these outfits, the following set of articles is suggested. Additions can be made as found advisable:

Soldering iron.
Screw drivers, several sizes.
Wrenches, hex., several sizes.
Combination pliers and wire cutters.
Hydrometer.
A. C. voltmeter, 4-8-150 volts.
0-50-250 D. C. voltmeter (1000-ohm-per-volt type).
Tubes—one or two of each type.
Headphones or speaker.
Continuity tester (described on Page 36).

The above equipment will provide for checking all batteries, tubes and the speaker, as well as the D. C. voltage of any circuit of set or power unit. Any troubles outside the set can thereby be immediately detected and if the difficulty is traced down to the set it can be disconnected and brought to the service shop for the usual routine circuit and voltage tests, and necessary repairs.

7. Keeping Records on Service

This feature is one which the dealer cannot afford to neglect if a smooth-running Service Department is to be maintained, and if the avoidance of misunderstandings with the customer and unnecessary correspondence with the distributor is desired.

Pads of printed forms, serially numbered and with sufficient copies for office records and the customer, should be used for handling repair jobs, and the date on which a set is brought in for repair, date repair is made, and also delivery date with customer's signature obtained, should be carefully entered.

It is extremely important for the dealer to fill out the warranty tag that accompanies each set and promptly return the post card section to his distributor. The dealer-record-card should be filed for reference in order to determine whether future repair jobs are in the warranty period.

If a repair "invoice" is made out separately, the number of the repair tag and all other data should be placed on the invoice.

All expenditures in the line of service should be recorded carefully in a suitable book, so that at the end of the year a comparison can be made between the cost of maintenance of the department and the total income from repair work done. The latter will, of course, be made up of the profit in repair parts and the amount charged for labor on repair work.

We also recommend the keeping of a careful "inventory" of the stock of repair parts. A "perpetual inventory" is the best if care is taken to keep it up to date. A record card should be maintained for each item kept in stock, and the quantity of this item and date received from the distributor recorded, as well as the date and repair number whenever one is used on a repair job. By going over the stock once a month or so, and checking the inventory, any items on which the stock is getting low can be ordered from the distributor and thus an adequate stock of all parts may be kept on hand at all times.

8. Service Personnel—the Psychology of Service

In the selection of a man or men to handle the Service Department of his store, the dealer should consider three main factors:

1—Education and experience.
2—Natural ability on radio repair work.
3—Ability to meet the customer.

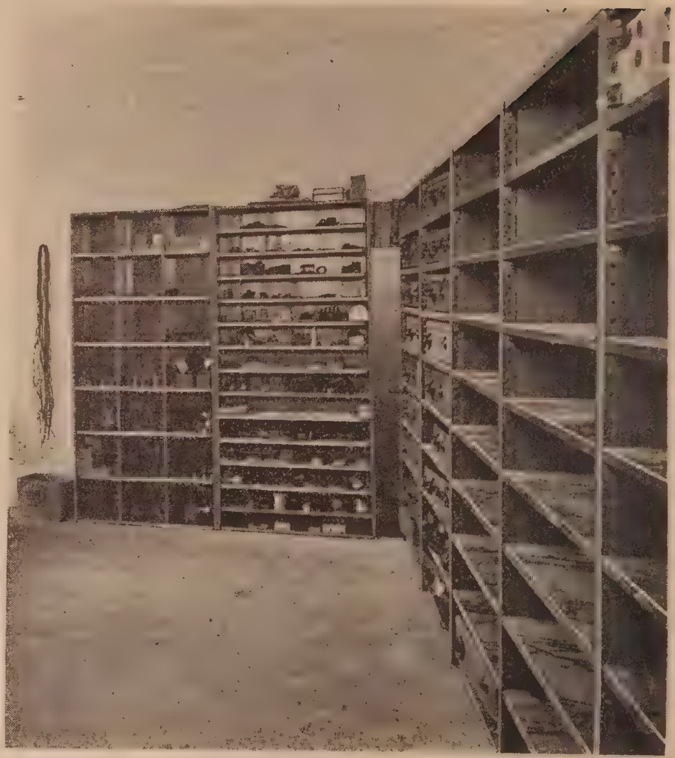
It is self-evident that to perform satisfactory work as a radio service man, experience along radio lines and ability along the lines of electrical and mechanical repair

Planning the Service Department (Continued)

work are essential. The third factor, however, is not usually given due consideration, in fact too often it is sadly overlooked.

The Service Department, rather than being looked upon as a necessary evil (as it was several years ago before the dealer had been educated to its true value), is now considered one of the biggest factors for building good-will and indirectly increasing sales that the dealer can possibly have. But this is not possible unless the service man takes the proper attitude toward the customers and his own work. He should always assume the attitude that "the customer is right." He should listen politely to his story of his trouble and endeavor to assure him cheerfully and convincingly that his difficulty will soon be a thing of the past. Confidence in the product and in his own ability will be a powerful factor in the service man's favor in this connection. He should never argue with a customer and never make promises he cannot fulfill. All appointments made should be kept without fail.

All in all, a proper understanding of the psychology of service on the part of the service man will help to make the Service Department a great asset to the eventual success of the radio dealer's business.



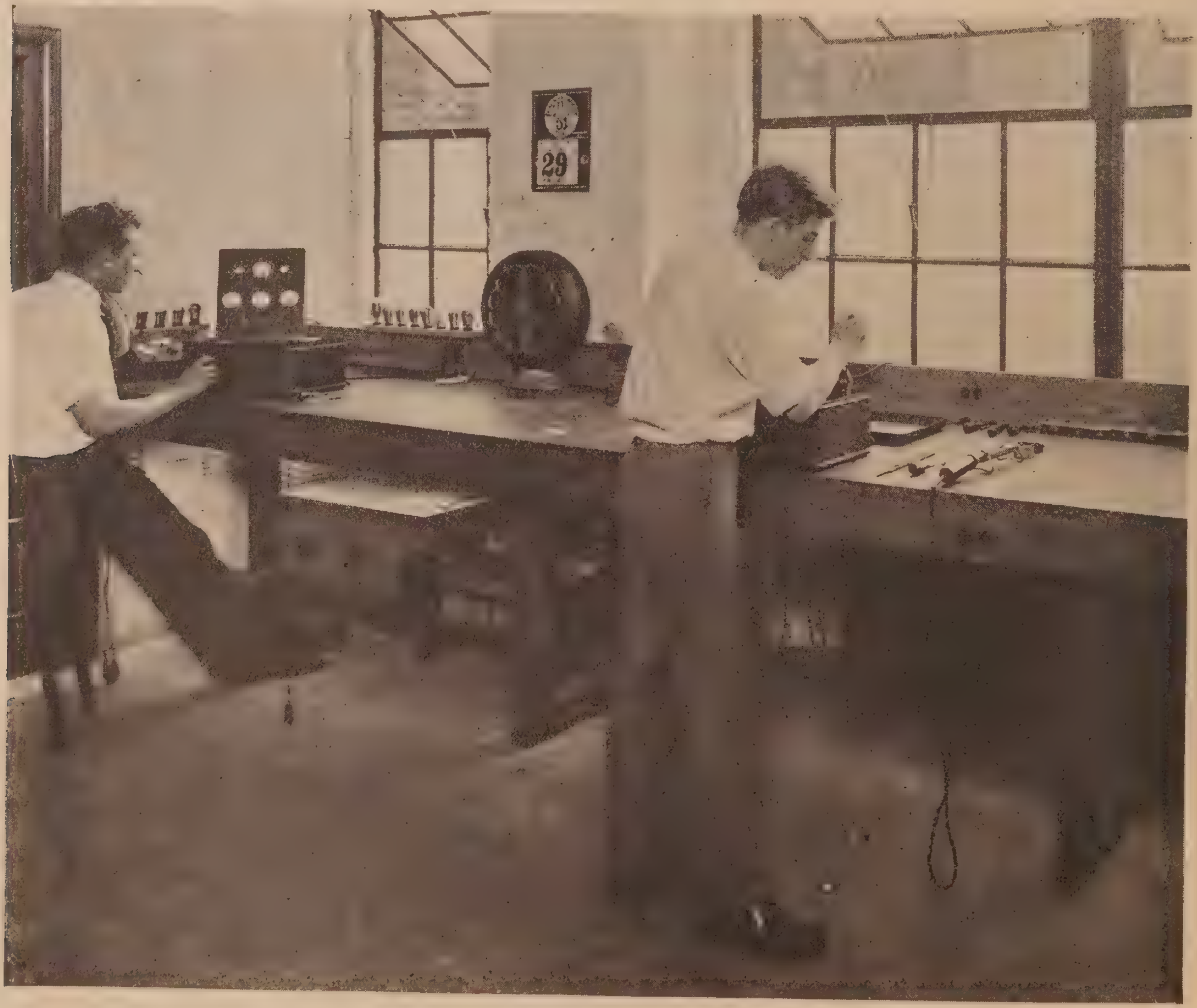


Fig. 34. Two Views of a Well-Laid-Out Service Room.

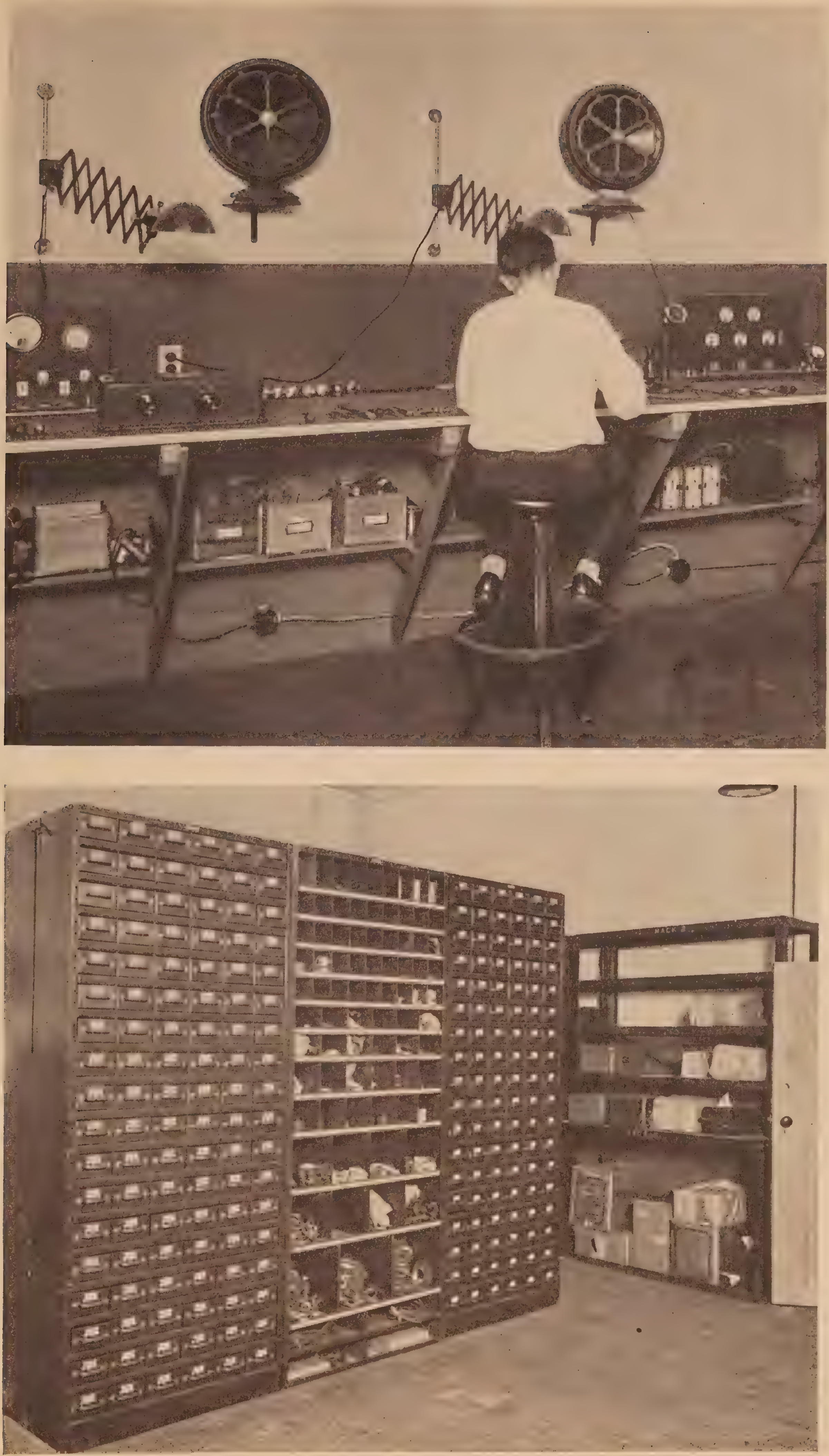


Fig. 35. Another Well-Arranged Service Department.

TESTING PROCEDURE

Points for Inspection

The following features should be given special attention in making the general visual inspection:

1—SOLDERED JOINTS—examine for firmness. A poor physical joint means a poor electrical connection. **Note especially ground lug connections.**

2—SCREWS, BOLTS AND NUTS—must be all tight.

3—INSULATION ON WIRING—must be perfect and not cut or frayed through where it passes metal edges of tube contacts, etc.

4—TUBE SOCKET CONTACTS—should be clean and tight.

5—SWITCHES—switch blades should be clean and make good contact. (Types other than toggle.)

6—DIAL KNOB—should operate smoothly and quietly.

7—RESISTORS—note if intact and tightly riveted or clamped in place.

8—R. F. TRANSFORMERS—examine for loose or damaged coils, or poor connections at terminals.

9—VARIABLE CONDENSERS—check for foreign particles between plates and note spacing between rotary and stationary plates.

10—RHEOSTATS or VOLUME CONTROL—must operate smoothly.

11—POWER SUPPLY CABLE—note condition of insulation on leads and condition of terminals at power end.

12—POWER UNIT (Early A. C. SETS)—cable connection panel must be bolted down tightly.

The set may then be tested in the following way:

(a) If there is no visible damage to the set (such as a shorted power unit with sealing-compound run over the edge, scratched R. F. transformers, broken tube sockets, etc.) it should be connected for operation, with all tubes in their sockets, and measurements should then be made of the plate, grid, and filament voltages. (Also check the volume control for smoothness of operation.)

These voltage measurements will usually indicate the exact source of trouble and the set may then be disassembled, if necessary, and repaired.

(b) After being repaired, and before reassembling in cabinet, it is advisable to apply continuity tests to the chassis and power unit. The continuity tests give a further check and minimize the possibility of delay in assembling the set before it is fully repaired.

(c) When repaired and assembled, the set should be connected to the output-measuring-circuit and oscillator and the variable condensers should be synchronized. Also again check the operation of the volume control. If a new power unit has been installed, the plate, grid-bias, and filament voltages should be measured. The set may then be switched over to an outside antenna and tested on broadcast signals.

(d) Before returning the set to the customer, a careful inspection should be made to make certain that all assembly screws are tight, that the tuning dial and volume-control knob are correctly adjusted, that the condenser-pulley set-screws are tight, that the cabinet is in good condition, etc.

CONTINUITY TESTS

All Atwater Kent receivers and power units may be tested for "grounds" and continuity of circuits, coils, resistors, etc., with a simple testing arrangement consisting of a voltmeter and battery connected as shown in Fig. 36. A 0-15 voltmeter with a 22½ volt "B" battery is recommended (the voltmeter should NOT be of a high-resistance type). In order to decrease the voltage across the meter to 15 volts, a volume control should be connected in series with the battery as shown in the diagram. The volume control may be adjusted occasionally to cut out resistance as the battery voltage drops off, thus bringing the voltmeter pointer to the 15 volt mark when the test prongs are touched together. Use the 18-volt tap on the battery.

Where the resistance of the circuit being tested is low, the meter should read practically 15 volts. In testing through the windings of a transformer or resistance unit, however, there will be a corresponding drop in voltage, and when testing across a condenser which is, of course, an insulator for D. C. (direct current) no reading should be obtained. If the results experienced on a certain test vary from the above general outline, trouble in the circuit or unit being tested is indicated.

In case there is any doubt as to whether a certain part has the correct resistance, it is desirable to compare its reading on the continuity meter with the reading secured on a new part of the same type.

A continuity meter is included in the meter panel described on Page 39.

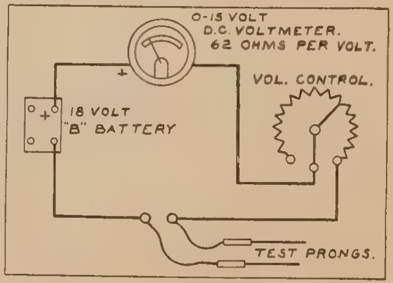


FIG. 36. DIAGRAM OF CONTINUITY TESTING CIRCUIT.

The volume control is part No. 9510.

SYNCHRONIZING VARIABLE CONDENSERS IN BELTED-TYPE RECEIVERS

In order to secure the best sensitivity, volume, and selectivity from a receiver of the single-dial type, it is extremely important that all the tuned circuits be synchronized at all settings of the tuning dial.

If the synchronism has been disturbed in a belted-type receiver, the condensers may be re-synchronized by loosening the pulley set-screws and adjusting the rotor of each condenser separately to give peak output on a constant-strength signal of 1000 kilocycles. The pulley screws are then tightened, and if the condensers and the R. F. transformers are matched, the synchronism should be good at all points on the dial. If the synchronism is not good at other points on the dial, as evidenced by weak reception, either the condensers or the R. F. coil group are not properly matched. In this case a new condenser group or a new transformer group (as necessary) should be installed and the condensers should be re-synchronized.

When synchronizing condensers, it is necessary to use a local oscillator to provide signals and a meter to indicate output volume.

The local oscillator is necessary in order to secure constant signal strength. Signals from broadcast stations are not sufficiently constant for this work.

An output meter is required to secure a reliable indication of output volume. The ear is not reliable for this purpose.

A suitable output measuring circuit is described on Page 41.

The oscillator feeds a weak signal into the receiver. The signal is amplified in the receiver and produces a reading on a meter that is connected to the output of the set. This meter indicates the strength of the output volume.

The reading on the output meter is greatest when all the tuned circuits in the set are adjusted to the same frequency as the oscillator signal. Therefore, if the variable condensers are adjusted separately to produce maximum output volume from the signal, each tuned circuit will be in resonance with the signal and in synchronism with each other.

It is necessary to check the variable condensers at three different broadcast frequencies in order to make certain that the tuned circuits are accurately synchronized at all settings of the tuning dial.

The oscillator must provide modulated signals at 1000, 800 and 600 kilocycles. The pick-up control or attenuator on the oscillator should be calibrated so that it may be re-set at any time to give the same output.

A No. 8112 grid condenser should be connected between the pick-up lead and the antenna post on the set.

The checking and synchronizing procedure is as follows:

Loosen the pulley set-screws on all condensers except the dial condenser. Adjust the rotor of each condenser separately to give peak output on the 600 K. C. signal. Note the position of the oscillator pick-up control and the peak reading of the output meter. Repeat this adjustment at 800 K. C. and finally at 1000 K. C.

Carefully tighten the pulley set-screws when the rotors are adjusted for peak output at 1000 K. C. The output reading at 1000 K. C. should be the same after the screws are tightened as before, otherwise the rotors have been disturbed while tightening the screws, and the operation must be repeated.

Now tune to 800 K. C. and readjust the oscillator pick-up to the same position it had when making the previous test at 800 K. C. The reading now, with the pulley screws tightened, should be at least 75% as much as the reading previously secured at this frequency when the rotors were adjusted separately.

The same comparison is made at 600 K. C.

If, with the pulley screws tightened, the output reading at 800 or at 600 K. C. is less than 75% of the reading that was secured when the rotors were adjusted separately, it indicates that either the R. F. transformers or the variable condensers are not matched, and a new group should be installed.

Note that the pulley set-screws are tightened when the rotors are adjusted for peak output at 1000 K. C. The set-screws should not be touched after that.

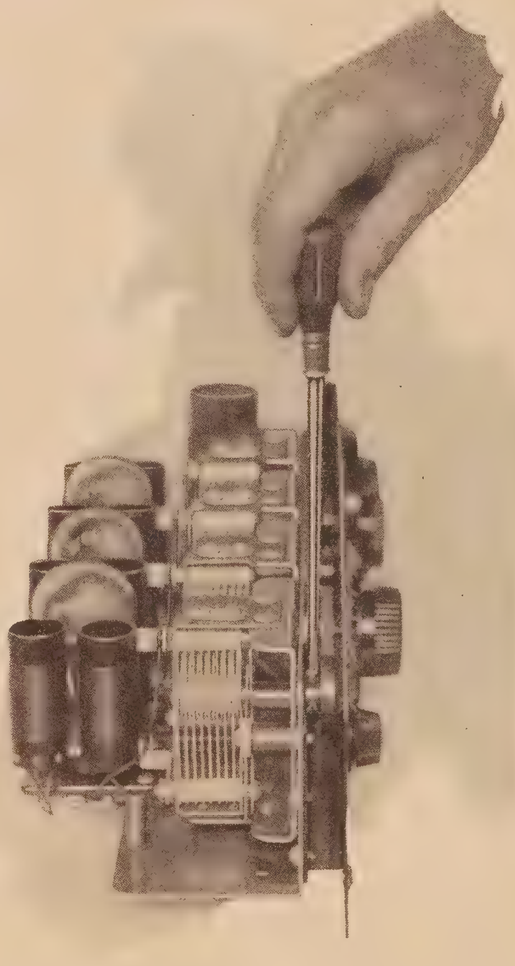


Fig. 37. Tightening Pulley Set Screws After Condensers Have Been Synchronized at 1,000 Kilocycles.

DESCRIPTION OF TESTING EQUIPMENT

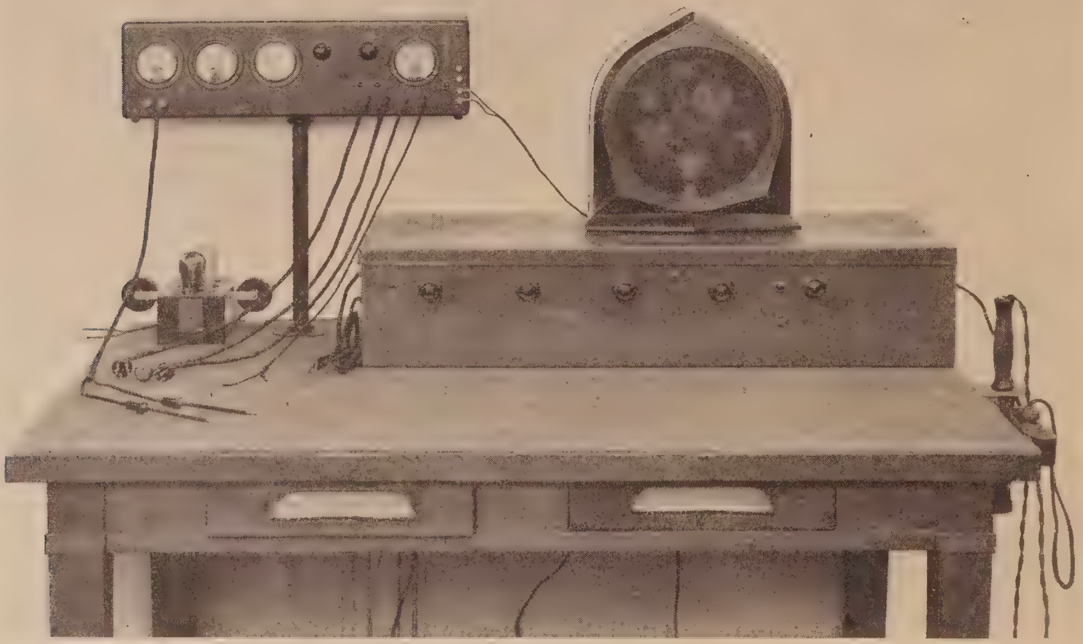


Fig. 38. Suggested Arrangement for a Testing Bench.

The complete equipment we suggest for enabling a complete test of any Atwater Kent receiver, together with equipment for measuring the output, is illustrated above.

At the left, supported on the vertical metal stand, is the combination voltmeter testing panel, and output measuring circuit or equipment. Below this is pictured a 130-K. C. oscillator used in testing our superheterodyne models.

To the right is a large metal box housing the four-wave oscillator used to generate signals on four standard broadcast frequencies. On the top of this is shown the inductor type Model JB speaker used to test reception (volume and quality) of any set being tested. A soldering iron for use in repairs is pictured on the extreme right, as is also the plug for deriving power for the test equipment from the local A. C. line. The two drawers in the table are used for tubes and tools.

The four-wave oscillator and the 130-kilocycle oscillator shown in this view are especially constructed and can not be purchased. For dealer use, we recommend the purchase of a well-shielded battery-operated oscillator that covers the broadcast range of frequencies and also 130 kilocycles. The frequency controls should be accurately calibrated, and it should be possible to reduce the pick-up practically to zero or increase it to the equivalent of a strong local broadcast signal. The pick-up control or attenuator should be calibrated so that it may be re-set to give the same output at any time.

The voltmeter panel includes an A. C. voltmeter, a D. C. voltmeter, a continuity meter, and a switch to cut in the particular meter and voltage range that is required for a given test. There are only two leads from this meter circuit and these are at the left-hand end of the panel.

An output measuring circuit is provided at the right-hand end of the panel. This includes a thermo-coupled milliameter, three toggle switches, a four-point rotary switch, a special transformer, and other miscellaneous parts. The output circuit is described on Pages 41 and 42.

The voltmeter panel is designed to fit a Model 36 cabinet. The cabinet is mounted on a pipe with flanges at each end, forming a very neat and sturdy mounting.

The top of the test bench should be covered with a sheet of tin which should be grounded through a toggle switch. The switch should be closed when testing A. C. or battery-operated screen-grid receivers and opened when testing D. C.-operated receivers.

The test bench should be used only for testing. A separate bench should be provided for repair work.

Description of Testing Equipment (Continued)

The Voltmeter Panel

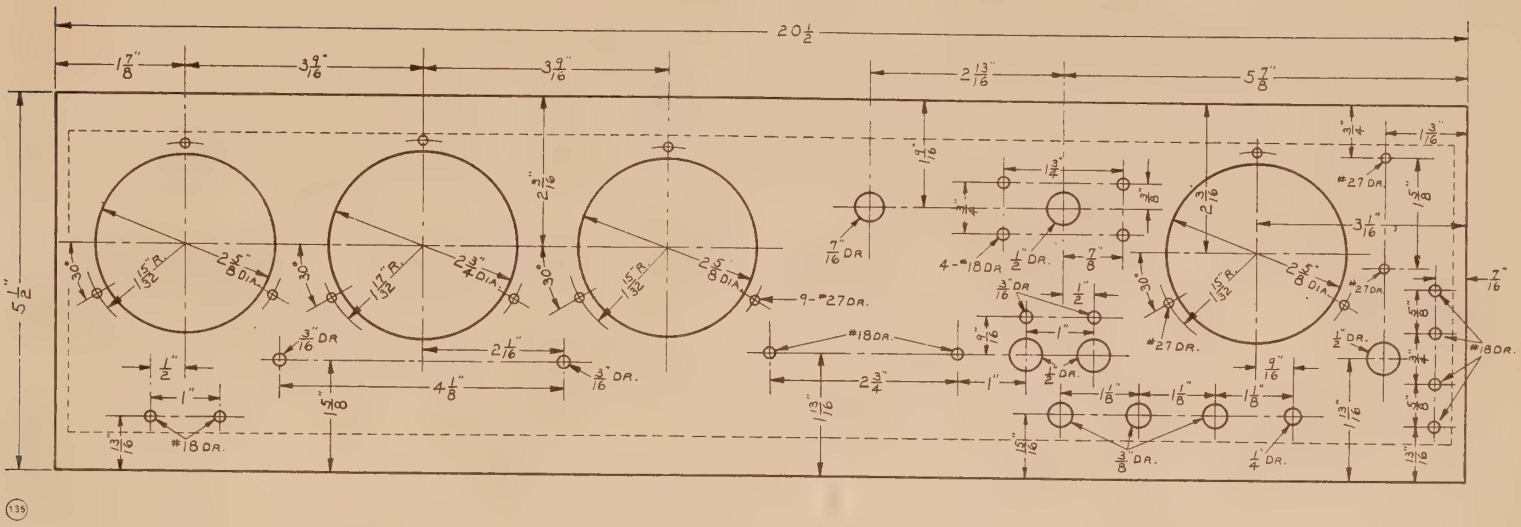

20½
1 7/8"
3 9/16"
3 9/16"
2 13/16"
5 7/8"
5½
2 5/8 DIA.
2 3/4 DIA.
15/32 R.
17/32 R.
30°
9-#27 DR.
#18 DR.
3/16" DR
7/16" DR
4-#18 DR
1/2" DR.
3/8" DR.
1/4" DR.
#27 DR.
2 1/16"
4 1/8"
2 3/4"
1"
135

FIG. 39. SUGGESTED LAYOUT FOR VOLTMETER PANEL.
Clips for a fuse are mounted on the front of the panel, at right side of the thermo-galvanometer.

The three meters at the left of the voltmeter panel are connected as shown on Page 40. These meters are used in measuring the voltages and testing the continuity of any Atwater Kent receiver.

The meter at the right of the panel (Fig. 39) is a thermo-galvanometer used in an output measuring circuit described on Page 41.

The equipment required for the voltmeter circuit is as follows:

1 Phenolite panel 1/16 inch by 20½ inches by 5½ inches.
1 High-resistance D. C. voltmeter, 0-50-250 volts.
1 Accurate 200,000-ohm resistor for the 250-volt range of the meter.
1 Accurate 250,000-ohm resistor for the 500-volt range of the meter.
1 A. C. voltmeter 0-4-8-150 volts.
1 D. C. voltmeter, 62-ohms-per-volt, 0-15 volts.
1 Part No. 9510 volume control for the continuity circuit.
1 Part No. 9991 toggle switch.
1 Rotary switch, nine points.
1 22½-volt "B" battery. Use the 18-volt tap.
1 Pair of testing prongs with leads.
4 Part No. 8215 binding posts.

The above parts, except binding posts, toggle switch and volume control, can NOT be purchased from the factory.

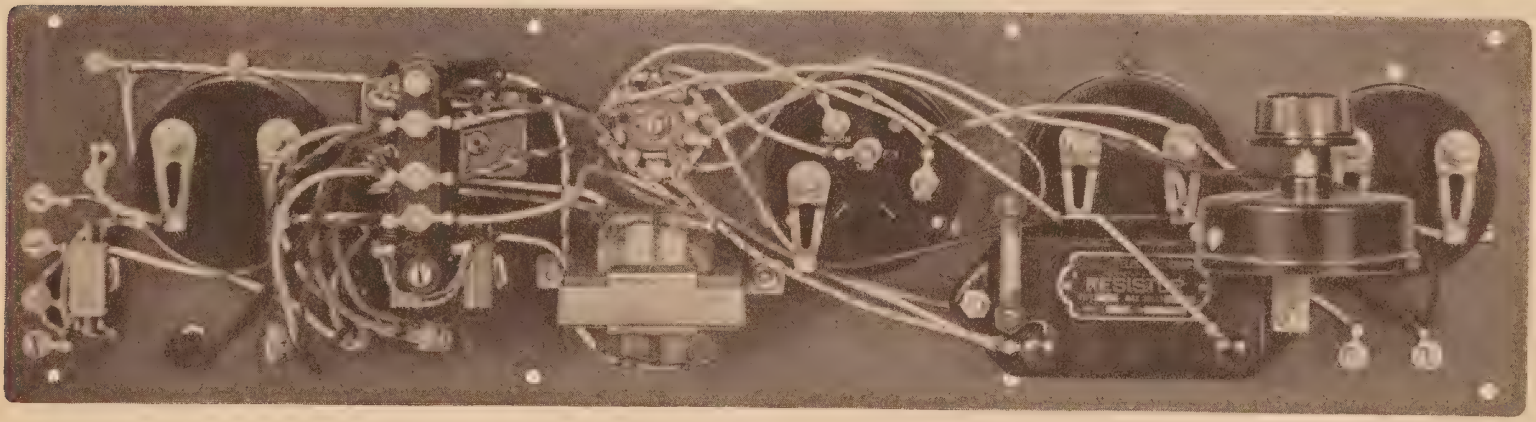

BINDING POSTS FOR JB SPEAKER AND PHONES SWITCH S1
THERMO-COUPLED GALVANOMETER "G"
RESISTORS R1, R2, R3, R4, SWITCHES S2, S3, S4
TRANSFORMER "T"
NINE-POINT SWITCH
0-4-8-150 A. C. VOLTMETER
250,000-OHM RESISTOR
200,000-OHM RESISTOR
0-50-250 D. C. HIGH-RESISTANCE METER
PART No. 9510 VOLUME CONTROL
BINDING POSTS FOR TEST POINTS
0-15 VOLTMETER
RESISTOR

FIG. 39-A. REAR VIEW OF METER PANEL.

Description of Testing Equipment (Continued)

The Voltmeter Panel

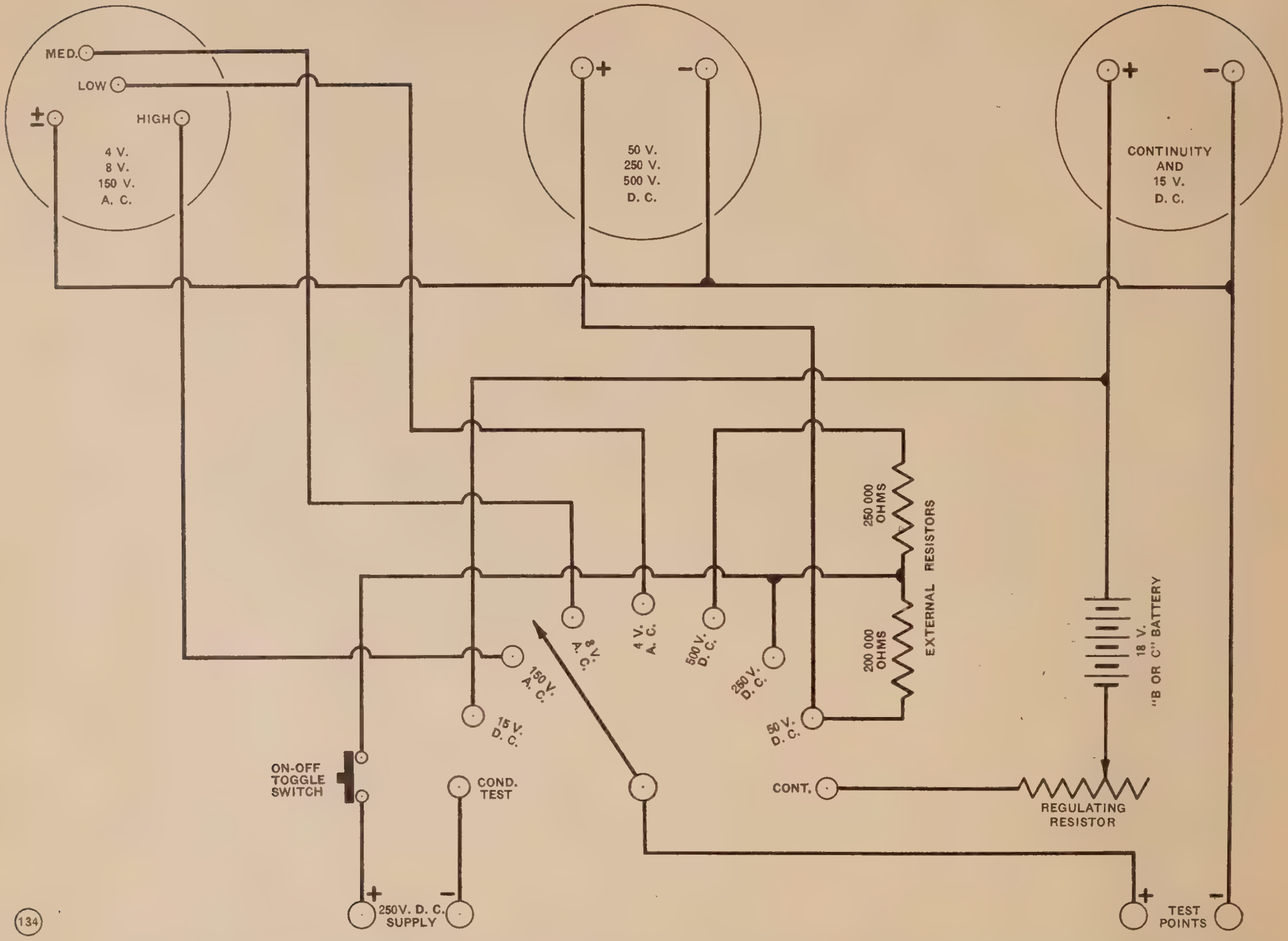

MED.
LOW
±
HIGH
4 V.
8 V.
150 V.
A. C.
+
−
50 V.
250 V.
500 V.
D. C.
+
−
CONTINUITY
AND
15 V.
D. C.
250 000 OHMS
200 000 OHMS
EXTERNAL RESISTORS
18 V.
"B OR C" BATTERY
8 V. A. C.
4 V. A. C.
500 V. D. C.
250 V. D. C.
150 V. A. C.
15 V. D. C.
50 V. D. C.
ON-OFF TOGGLE SWITCH
COND. TEST
CONT.
REGULATING RESISTOR
+
250V. D. C. SUPPLY
−
+
TEST POINTS
−
134

FIG. 40. DIAGRAM OF VOLTMETER TESTING CIRCUIT AS SEEN FROM REAR.

The high-resistance D. C. voltmeter has a scale reading of 0-50-250 volts, but utilizes external resistors for the 250 and 500 volt ranges. These resistors must be accurate.

The A. C. voltmeter is used for measuring line voltage, the filament voltage of A. C. receivers and all other circuits where A. C. is present and a measurement is required.

The high-resistance D. C. voltmeter is used to check plate and grid voltage, filament voltage on D. C. sets, battery voltage, "B" power units, etc. In general it is desirable to use the 250 or 500 volt scale when checking grid or plate voltage.

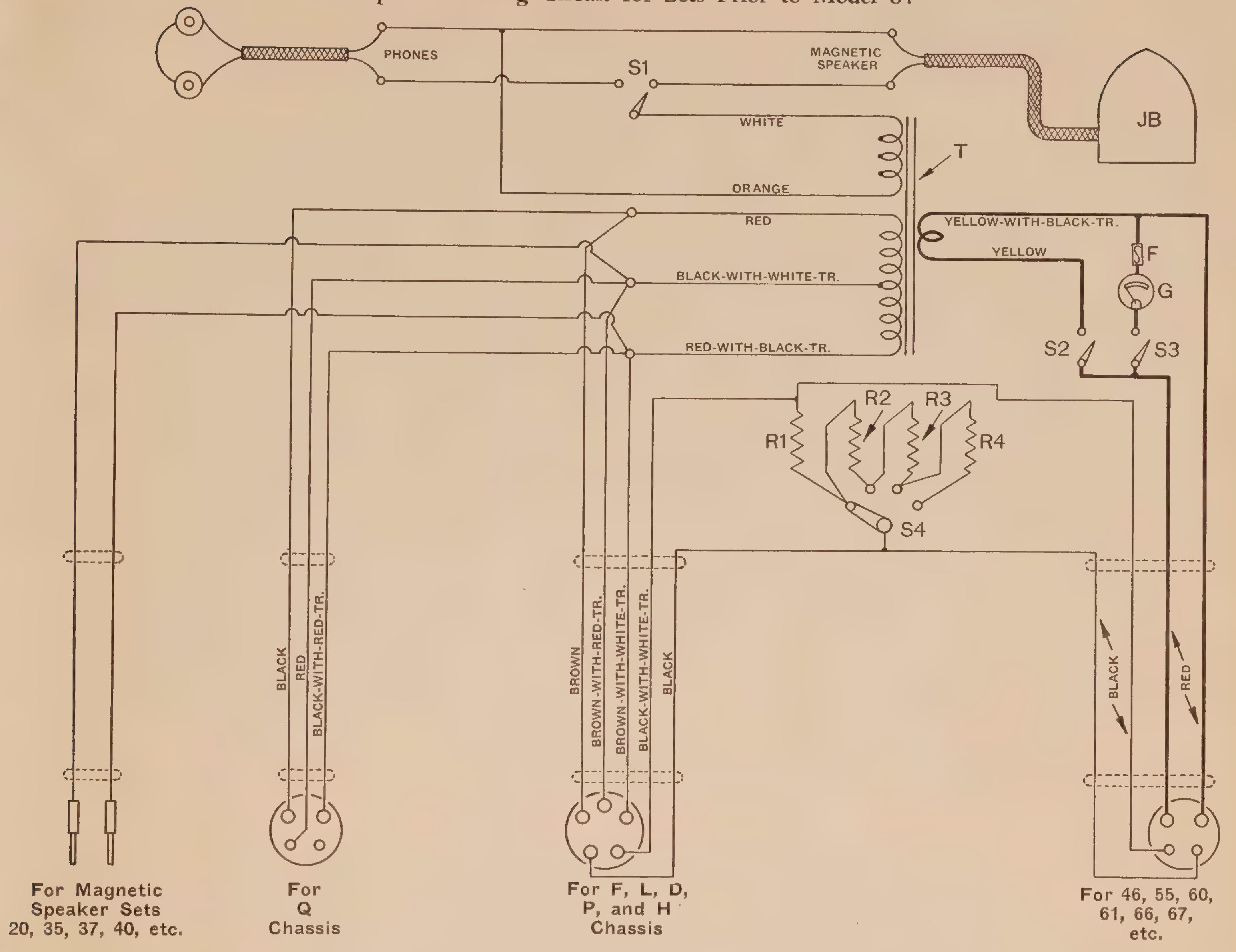
The continuity meter is used for checking resistors, transformers, chokes, condensers and other parts for open circuits or short circuits. The regulating resistor (volume control) should be adjusted to give full scale deflection when the test points are touched together.

The condenser test using 250 volts is for use in checking leakage in high-voltage paper-dielectric filter condensers. It should not be used in testing filament-circuit by-pass condensers; the latter should be tested with the continuity meter which employs only 18 volts.

The 250-volt supply for the condenser test may be secured from a "B" power unit or from a Model 42 power unit.

Description of Testing Equipment (Continued)

Output Measuring Circuit for Sets Prior to Model 84


PHONES
MAGNETIC SPEAKER
S1
JB
WHITE
T
ORANGE
RED
YELLOW-WITH-BLACK-TR.
YELLOW
F
G
BLACK-WITH-WHITE-TR.
RED-WITH-BLACK-TR.
S2
S3
R1
R2
R3
R4
S4
BLACK
RED
BLACK-WITH-RED-TR.
BROWN
BROWN-WITH-RED-TR.
BROWN-WITH-WHITE-TR.
BLACK-WITH-WHITE-TR.
BLACK
BLACK
RED
For Magnetic Speaker Sets 20, 35, 37, 40, etc.
For Q Chassis
For F, L, D, P, and H Chassis
For 46, 55, 60, 61, 66, 67, etc.

CAUTION—USE ONLY ONE OF THESE FOUR CABLES AT ONE TIME

FIG. 41. DIAGRAM OF OUTPUT MEASURING CIRCUIT.

An output measuring circuit is provided at the right-hand end of the meter panel shown on Page 38. The output meter is used in synchronizing variable condensers as explained on Page 37.

The diagram of this output measuring circuit is shown above. Its main advantage is that only one speaker, a type JB, is required in testing any type of Atwater Kent receiver. This eliminates the necessity of tying up four or five electro-dynamic speakers. This improvement is made possible through the use of a special output transformer, and a series of resistors which take the place of the field coil in the various types of Atwater Kent electro-dynamic speakers.

(If it is not convenient to build an output measuring circuit of this type, we recommend the use of a multi-range rectifier-type 4000-ohm A. C. voltmeter with a full scale reading of about 150 volts. This forms a very satisfactory device and may be purchased from most service-instrument manufacturers. In order to use this meter with an electro-dynamic receiver, it is necessary to have the correct electro-dynamic speaker connected to the set. Follow the manufacturers instructions regarding the connections for meter.)

Operation of Output Circuit

(A) Throw S1 to the right to test for quality on the JB speaker.

Throw S1 to the left to pick up oscillator signals on the phones when synchronizing variable condensers.

(B) When testing an A. C.-operated electro-dynamic set, move S4 to the tap that gives the correct resistance to take the place of the field coil in the speaker for that particular set.

Tap 1 (left) takes place of F-6 field coil.
Tap 2 takes place of F-4 or N field coil.
Tap 3 takes place of F-2 field coil.
Tap 4 takes place of F field coil.

It is NOT necessary to use a "dummy" field load when testing a battery-operated or D. C.-operated electro-dynamic receiver. When testing such a receiver, S4 may be turned to the 4th tap (right).

(Continued on next page.)

Description of Testing Equipment (Continued)

Output Measuring Circuit

(C) MAGNETIC SETS. When testing a magnetic-type set, such as Model 20, 35, 37, 40, etc., connect the two-conductor cord to the speaker-posts on the set being tested. Close both S2 and S3 if a reading on the meter is desired; open either S2 or S3 to open the meter circuit.

(D) INDUCTOR SETS. In testing a Type Q chassis, insert the three-conductor plug in the speaker-plug socket on the Q Chassis. Close both S2 and S3 if a reading is desired on the output meter. Open either S2 or S3 to open the meter circuit.

(E) FIVE-PRONG ELECTRO-DYNAMIC SETS. In testing an L, P, D, F or H Chassis, insert the five-conductor plug in the speaker-plug socket on the chassis, and, if the chassis is A. C.-operated, set S4 at the correct tap. To get a reading on the meter, close S2 and S3; to open the meter circuit, open either S2 or S3.

(F) FOUR-PRONG ELECTRO-DYNAMIC SETS. In testing a Model 46, 55, 60, 61, 66, 67, etc., insert the four-conductor plug in the speaker-plug socket on the chassis. If the chassis is A. C.-operated, set S4 at the correct tap. To get a reading on the meter, close S3 and open S2. To operate the phones or JB speaker, close S2 and open S3. To operate both the phones and the meter, close both S2 and S3.

List of Parts

The meter "G" and the fuse "F" are **NOT** supplied from the factory.

(T) No. 18911 output transformer. This transformer has an extra winding which couples the speaker or phones to the output circuit of the particular set that is being tested.

S1—No. 13678 toggle switch.
S2, S3—No. 9991 toggle switches.
S4—No. 16430 switch.
R1—Four No. 16988 resistors in series.
R2—Three No. 16988 resistors in series.
R3—Four No. 16988 resistors in series.
R4—Five No. 16988 resistors in series.
F—¼ ampere fuse.
G—115 ma, thermo-coupled galvanometer.
I—No. 14169 double-conductor cord.
I—No. 17866 three-conductor cord-and-plug.
I—No. 17556 four-conductor cord-and-plug.
I—No. 17895 five-conductor cord-and-plug.
4—No. 8215 binding posts.

ABBREVIATIONS USED IN VOLTAGE TABLES

Abbreviation	Meaning
1 R	1st radio frequency socket
2 R	2nd radio frequency socket
3 R	3rd radio frequency socket
4 R	4th radio frequency socket
D	Detector socket
1 A	1st audio frequency socket
2 A	2nd audio frequency socket
2Aa	2nd audio frequency socket
3 A	3rd audio frequency socket
+ F	Positive filament contact
— F	Negative filament contact
G	Grid contact
P	Plate contact
S	Screen-grid contact
C (in A. C. sets)	Cathode contact
R. F. T.	Radio frequency transformer
A. F. T.	Audio frequency transformer

In the tables, to identify a certain contact of a certain socket, the abbreviation of the contact is combined with the abbreviation of the socket.

Thus the grid (G) contact of the third R. F. socket is referred to as G3R. The negative filament contact of the second A. F. socket is referred to as —F2A. The cathode of the detector socket (in A. C. sets) is CD. P2A means the plate contact of the second audio frequency socket, and so on.

The use of these symbols will enable the service man quickly to recognize the corresponding socket on the set without having to refer to the chart or wiring diagram.

In all cases where "—F" and "+F" appear on the diagrams and drawings of Atwater Kent A.-C.-operated receivers, these markings are used for identification purposes only, as the A. C.-operated filaments or heaters have no fixed polarity.

OPERATING VOLTAGE TESTS

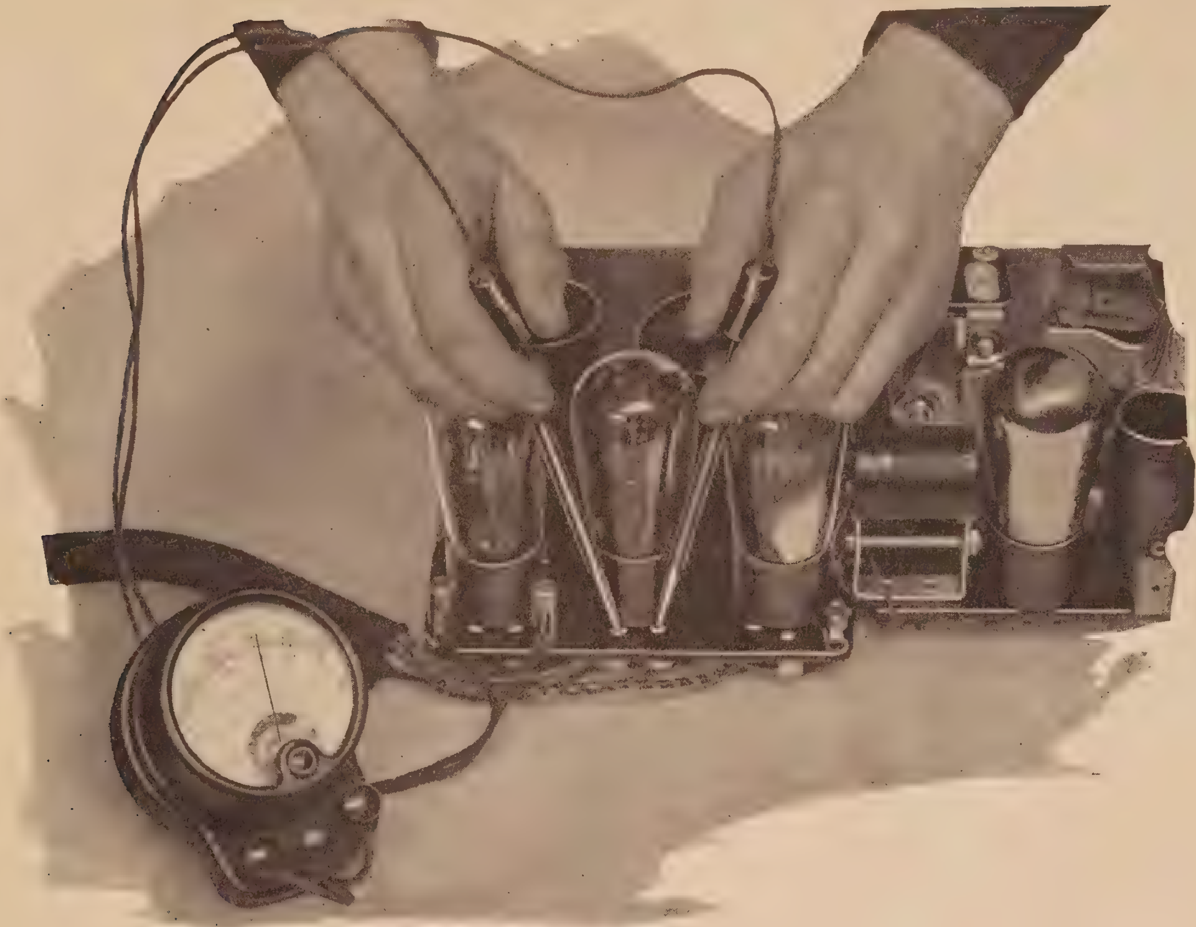


FIG. 42. BY MAKING CONTACT TO THE SOCKET EYELETS, IT IS POSSIBLE TO MEASURE VOLTAGES WITHOUT REMOVING THE CHASSIS FROM CABINET.

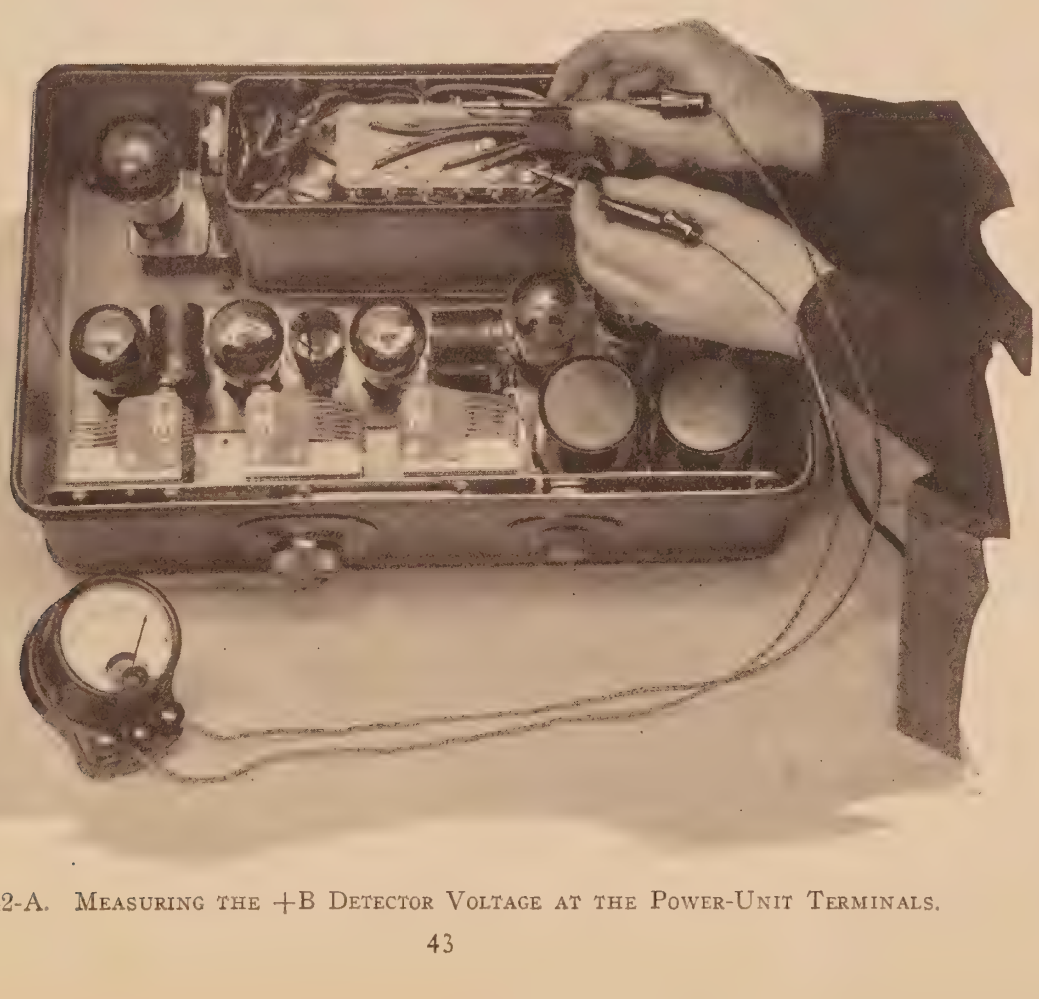


FIG. 42-A. MEASURING THE +B DETECTOR VOLTAGE AT THE POWER-UNIT TERMINALS.

Operating Voltage Tests (Continued)

The table of voltages (for A. C. receivers prior to screen-grid) on the facing page, is arranged logically to trace defects from the source of power, and it is advisable to follow the table as given. The sketch Fig. 42-B of the top view of Model 42 type of receiver shows clearly the identification of the various socket-contact eyelets in all Atwater Kent receivers of this general type. These eyelets are partly covered by the tube bases, when the tubes are in the sockets, but contact may be made to the eyelets through long, thin brass or steel test prongs, sharpened at the ends. The prongs should be pressed down on the eyelets and twisted in order to remove the insulating coating from the eyelets and make good contact. In screen-grid models, the socket-contact eyelets can not be reached from the top of the set, so it is necessary to invert the receiver and remove the bottom plate, thus exposing all socket-contacts, etc. A chart showing the identification of these contacts is given in the description of each screen-grid receiver.

If it is necessary to remove the chassis or power unit from the cabinet to make repairs, we suggest that the regular continuity tests be applied to these parts before reassembling in the cabinet.

In using the accompanying voltage table (for receivers prior to screen-grid) remember that the voltages listed are only approximate, being the average values for the various models.

When testing a defective set, many service men prefer to locate the defective part or circuit before removing the chassis or power unit from the cabinet. This may be done by measuring the plate, grid, and filament voltages at the power-unit terminals and at each tube socket while the set is connected for operation, with all tubes in their sockets and the 110-volt supply current turned on. If made systematically, the voltage measurements provide a quick method of locating defective parts. The voltages at the terminals of the power unit should be measured first, and then the voltages at the tube sockets, making contact through the eyelets that clamp the socket-contacts to the molded base. The illustrations, Figs. 42 and 42A show how the voltmeter leads are put in contact with the socket-eyelets, or with the power-unit terminals, when making measurements. In screen-grid type receivers, the set should be inverted, with bottom plate removed, and measurements made directly to the socket-contacts, as outlined in the voltage table which accompanies the description of each screen-grid receiver.

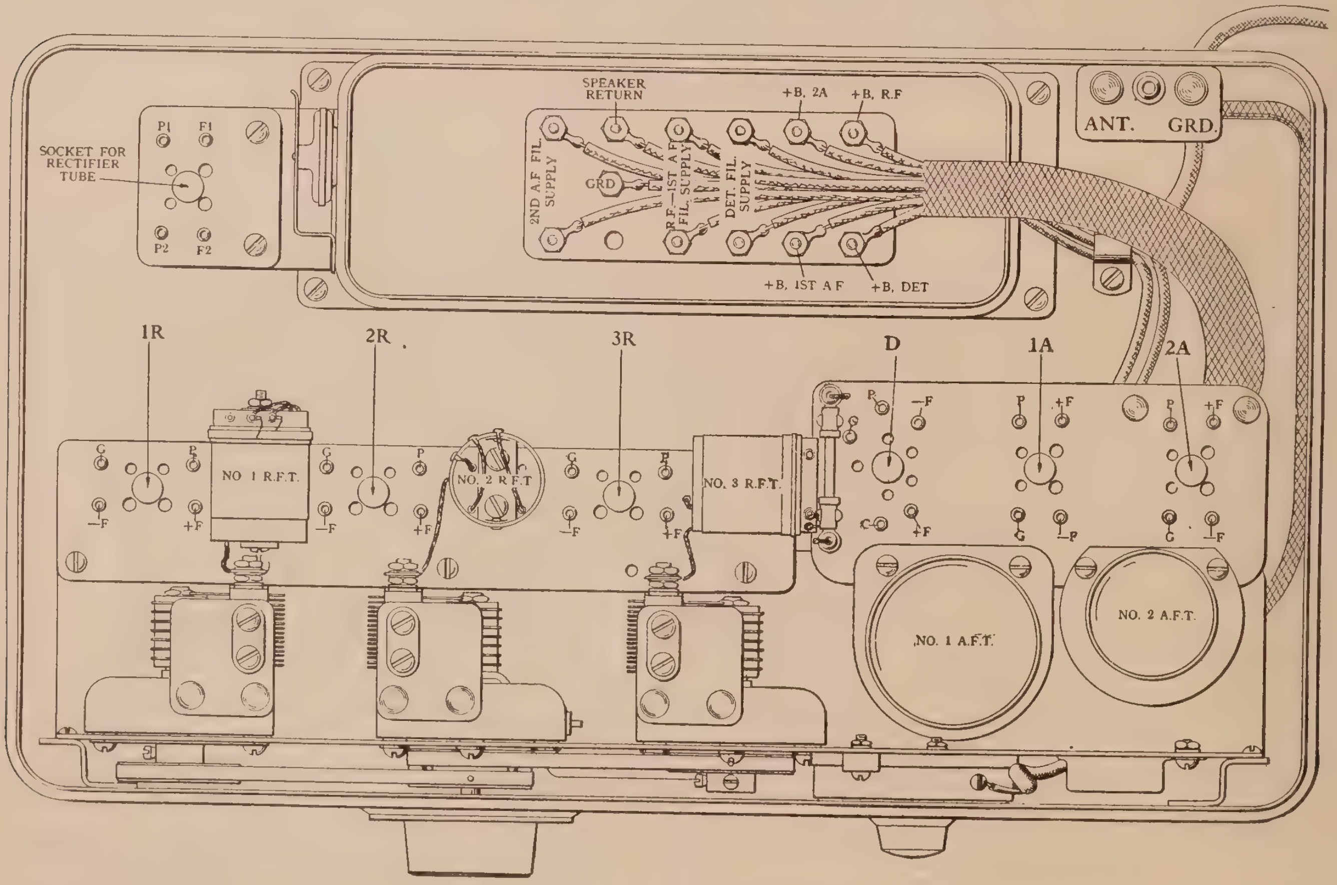


Fig. 42-B. Top View of Model 42 Receiver.

The identification of socket-contact eyelets in this view may be applied to all Atwater Kent receivers of this general type.

The voltage of the three filament circuits are approximately as follows:

R. F.-1st-A. F. filament supply terminals=1.5 volts.
Detector filament supply terminals=2.5 volts.
2nd-A. F. filament supply terminals=5.0 volts.

VOLTAGE READINGS ON A. C. SETS (Prior to Screen-Grid)

TESTS MADE WITH SET IN OPERATION, ALL TUBES IN SOCKETS

Use High-Resistance D. C. Voltmeter (About 0-50-250) To Measure Plate and Grid Voltages. Use A. C. Voltmeter To Measure Filament Voltages.

MAKE TESTS IN ORDER LISTED

Voltages at Power Unit

	MEASURE ACROSS	Approx. Voltage	NO VOLTAGE INDICATES**	REMEDY
FILAMENT VOLTAGES	2.5V Fil. Supply Terminals.	2.4	Open filament winding or open connection in power transformer.	Replace power transformer assembly.
	1.5V Fil. Supply Terminals.	1.5		
	5V Fil. Supply Terminals.	4.9		
	F1 to F2 (on Rect. Socket).	4.9		
"B" VOLTAGES**	One 1.5V Fil. Supply Terminal to +B, R.F.	180	Open high-voltage winding, open filter choke or open R.F.-1st-A.F. bias resistor.	Apply continuity tests across filter and high-voltage winding. Repair as necessary.
	One 1.5V Fil. Supply Terminal to +B, 1st-A.F.	155	Open 1st-A.F. plate resistor.	Replace resistor.
	One 2.5V Fil. Supply Terminal to +B, Det.	45	Open Det. plate resistor.	Replace resistor.
	One 5V Fil. Supply Terminal to +B, 2A.	180	Open speaker-choke, open pri. of output trans., or open 2nd-A.F. bias resistor.	Replace defective assembly.
BIAS VOLTAGES	Ground to one 1.5V Fil. Supply Terminal.	13	Open R.F.-1st-A.F. grid-bias resistor.	Replace defective resistor.
	Ground to one 5V Fil. Supply Terminal.	45*	Open 2nd-A.F. grid-bias resistor.	

Voltages at Tube Sockets

	MEASURE ACROSS SOCKET EYELETS	Approx. Voltage	NO VOLTAGE INDICATES**	REMEDY
FILAMENT VOLTAGES	—F to +F on each R.F. Socket and on 1st-A.F. Socket.	1.4	Open fil. leads, cable or broken cable connection.	
	—FD to +FD.	2.3		
	—F2A to +F2A.	4.8		
PLATE VOLTAGES**	—F4R to P4R. (4th R.F. not used in all Models.)	160-180	Open white cable lead, open R.F. plates res. or open pri. No. 4 R.F.T.	Remove Chassis from cabinet. Apply continuity tests, and repair as necessary.
	—F3R to P3R.	160-180	Open white cable lead, open R.F. plate res., or open pri. No. 3 R.F.T.	
	—F2R to P2R.	160-180	Open primary circuit No. 2 R.F.T.	
	—F1R to P1R.	160-180	Open primary circuit No. 1 R.F.T.	
	—FD to PD.	45	Open yel. cable lead, open connection or open primary No. 1 A.F.T.	
	—F1A to P1A.	155	Open black-red-tracer cable or open pri. No. 2 A.F.T.	
	—F2A to P2A.	180	Open connection or open primary of output transformer.	Test output trans. and connections.
	—F2Aa to P2Aa. (2Aa tube used on electro-dynamic Sets.)	180		
GRID VOLTAGES	G1R to —F1R.	13	Open ant. coil (choke or secondary of antenna trans.).	Remove Chassis from cabinet. Apply continuity tests, and repair as necessary.
	G2R to —F2R.	13	Open sec. No. 1 R.F.T. or open No. 1 grid resistor.	
	G3R to —F3R.	13	Open sec. No. 2 R.F.T. or open No. 2 grid resistor.	
	G4R to —F4R. (4th R.F. not used in all Models.)	13	Open sec. No. 3 R.F.T. or open No. 3 grid resistor.	
	G1A to —F1A.	13	Open secondary No. 1 A.F.T.	
	G2A to —F2A.	45*	Open secondary No. 2 A.F.T.	
	G2Aa to —F2Aa. (2Aa tube used on electro-dynamic Sets.)	45*	Open secondary No. 2 A.F.T.	

---

* 15 volts on Model 43.

** Low plate voltage may indicate a leaky condenser. A shorted filter-condenser will cause overheating. The plate voltages in Model 36 and early 37 are lower than given in this table.

MODEL 10 AND 10B

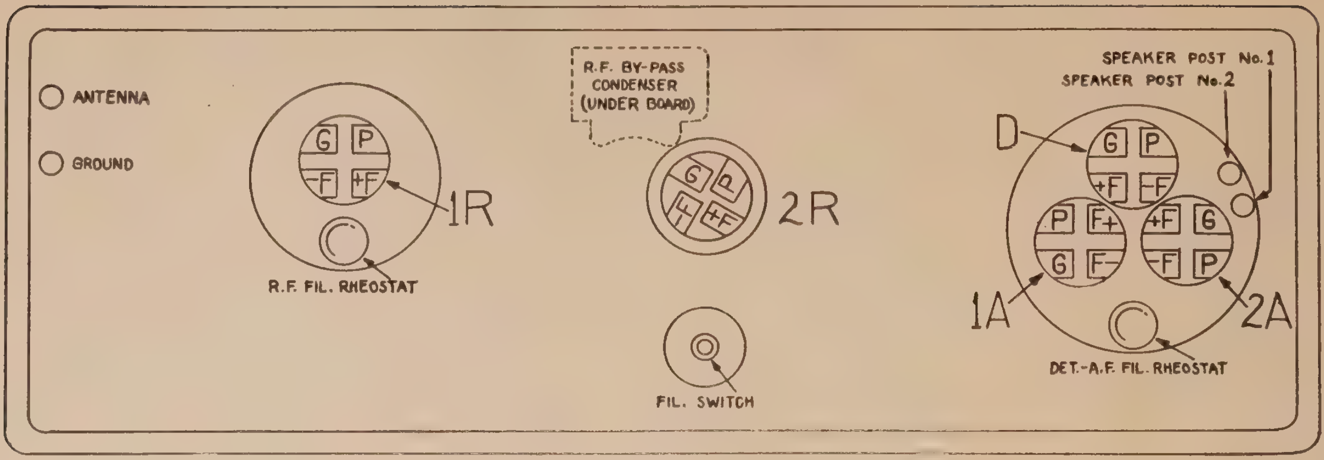

ANTENNA
GROUND
G
P
-F
+F
1R
R.F. FIL. RHEOSTAT
R.F. BY-PASS CONDENSER (UNDER BOARD)
2R
FIL. SWITCH
SPEAKER POST No. 1
SPEAKER POST No. 2
D
1A
2A
DET.-A.F. FIL. RHEOSTAT

Fig. 43. Top Chart of Model 10.

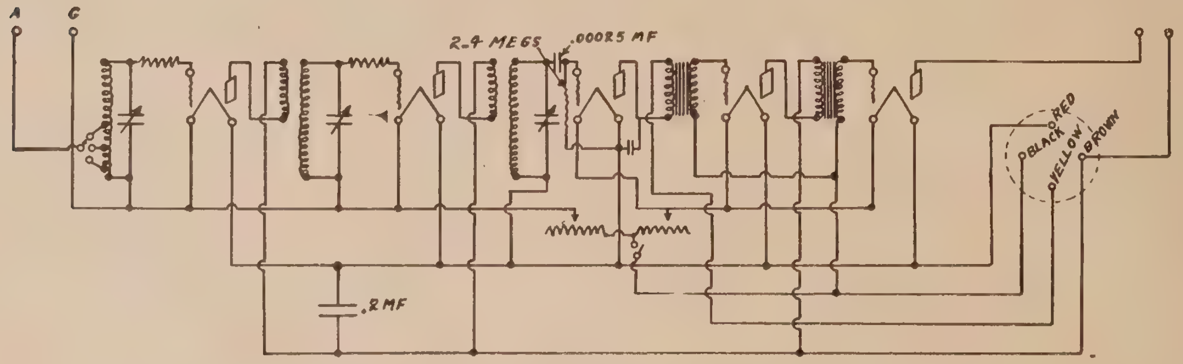

A
G
2-4 MEGS
.00025 MF
.2 MF
RED
BLACK
YELLOW
BROWN

Fig. 44. Schematic Diagram of Model 10.

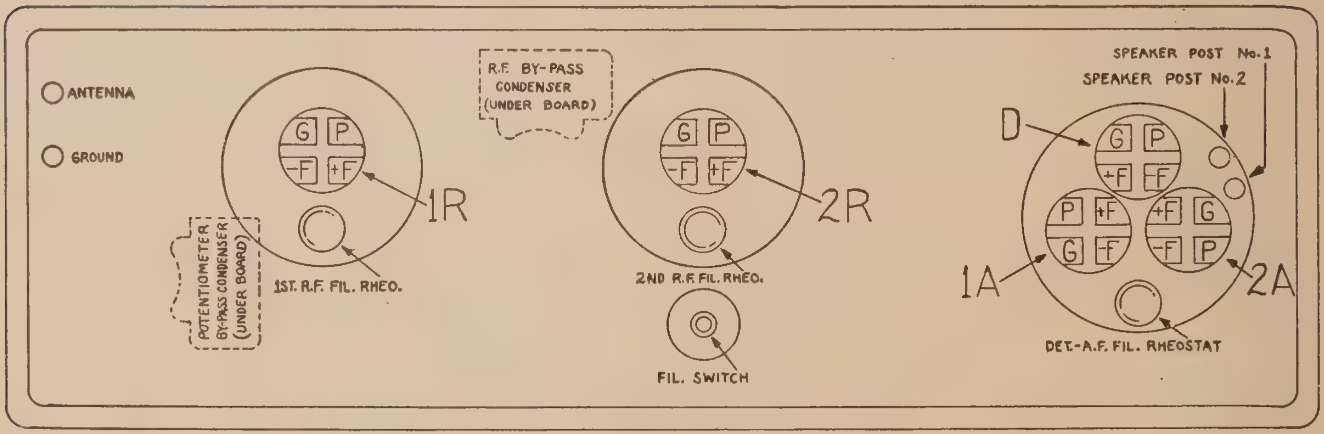

ANTENNA
GROUND
G
P
-F
+F
1R
1ST. R.F. FIL. RHEO.
POTENTIOMETER BY-PASS CONDENSER (UNDER BOARD)
R.F. BY-PASS CONDENSER (UNDER BOARD)
2R
2ND R.F. FIL. RHEO.
FIL. SWITCH
SPEAKER POST No. 1
SPEAKER POST No. 2
D
1A
2A
DET.-A.F. FIL. RHEOSTAT

Fig. 45. Top Chart of Model 10B.

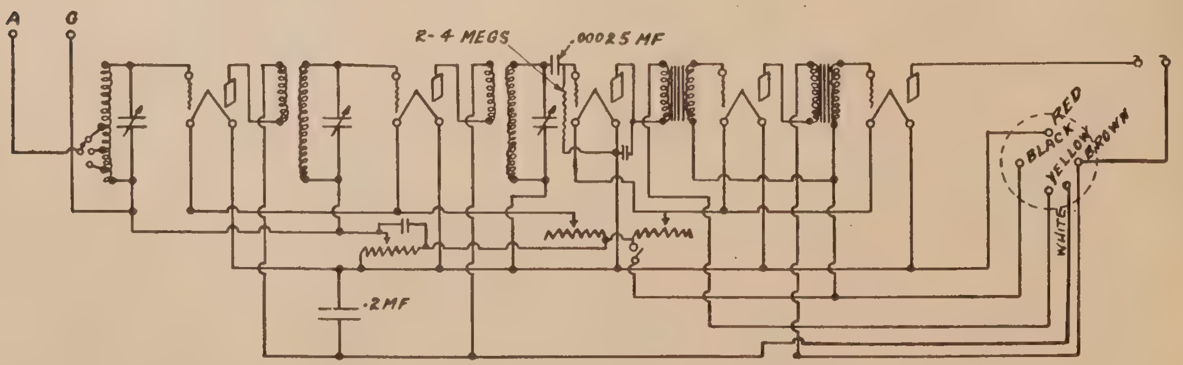

A
G
2-4 MEGS
.00025 MF
.2 MF
RED
BLACK
YELLOW
BROWN
WHITE

Fig. 46. Schematic Diagram of Model 10B.

This set has two R. F. rheostats (one for each R. F. tube). —F1R connects to the slider of the 1st-R. F. rheostat instead of to —F2R.

MODEL 12, AND MODEL 20, No. 4640

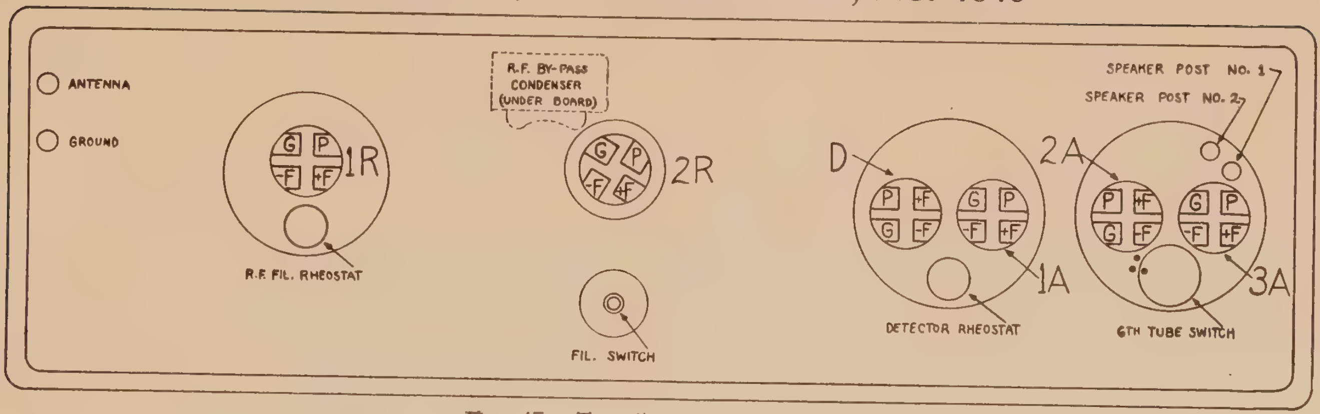

ANTENNA
GROUND
R.F. BY-PASS CONDENSER (UNDER BOARD)
G P -F +F
1R
2R
R.F. FIL. RHEOSTAT
FIL. SWITCH
D
2A
SPEAKER POST NO. 1
SPEAKER POST NO. 2
1A
3A
DETECTOR RHEOSTAT
6TH TUBE SWITCH

Fig. 47. Top Chart of Model 12.

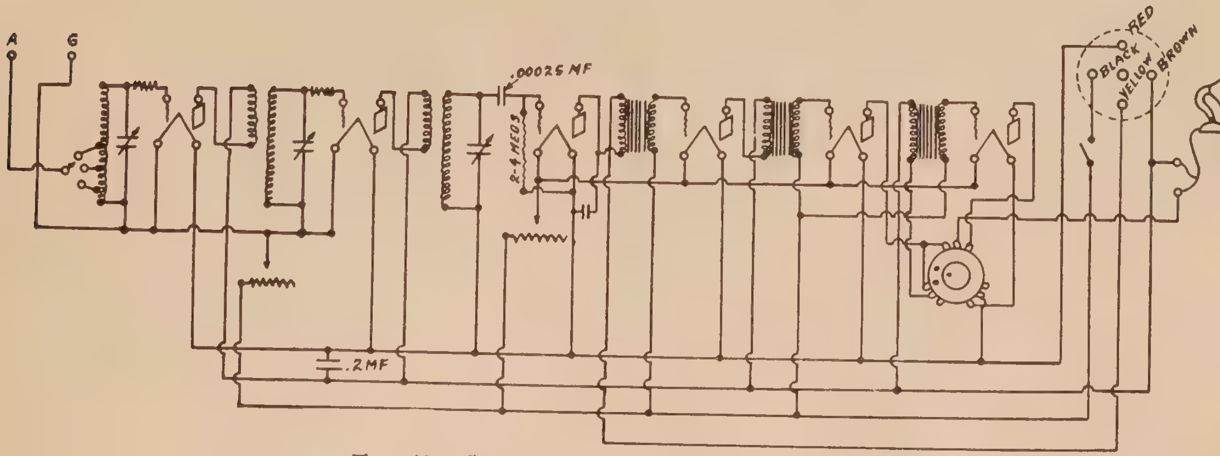

A
G
.00025 MF
2-4 MEGS
.2MF
RED
BLACK
YELLOW
BROWN

Fig. 48. Schematic Diagram of Model 12.
Diagram shows one rheostat controlling detector and all three A. F. tubes. In actual set, rheostat controls detector and 1st audio only, 2nd and 3rd audio tubes being on separate fixed resistors.

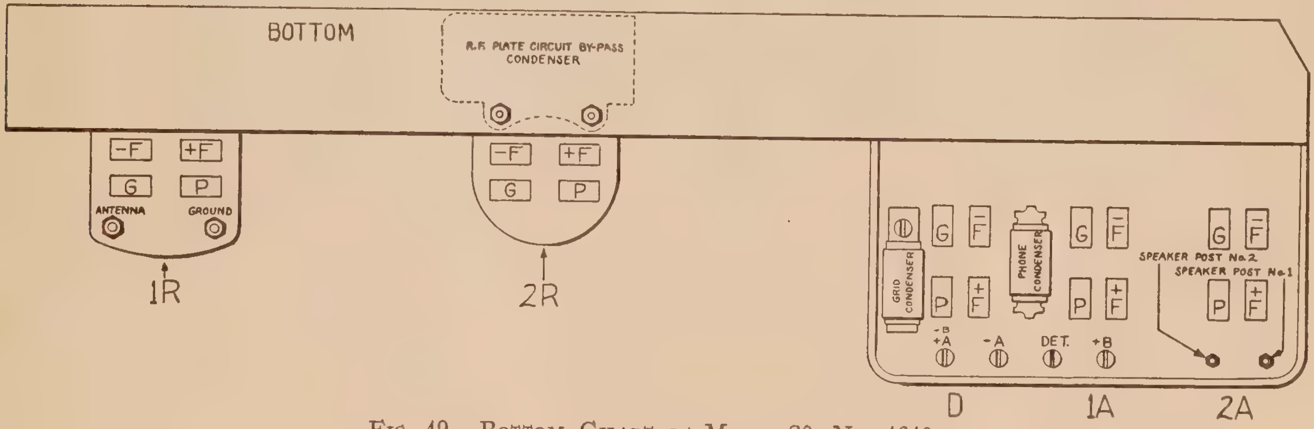

BOTTOM
R.F. PLATE CIRCUIT BY-PASS CONDENSER
-F +F G P
ANTENNA
GROUND
1R
2R
GRID CONDENSER
PHONE CONDENSER
G F P +F
-B +A
-A
DET.
+B
SPEAKER POST No. 2
SPEAKER POST No. 1
D
1A
2A

Fig. 49. Bottom Chart of Model 20, No. 4640.

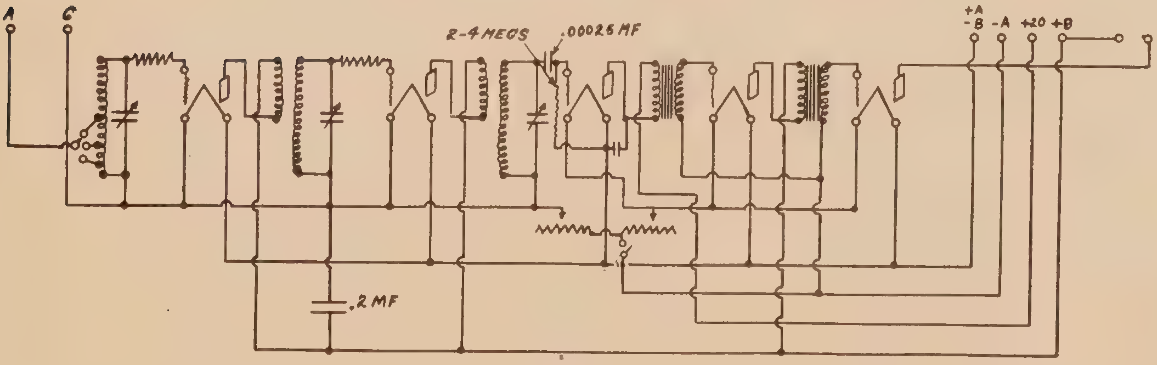

A
G
2-4 MEGS
.00025 MF
+A -B
-A
+20
+B
.2MF

Fig. 50. Schematic Diagram of Model 20, No. 4640.

MODEL 20, No. 7570 AND No. 7960

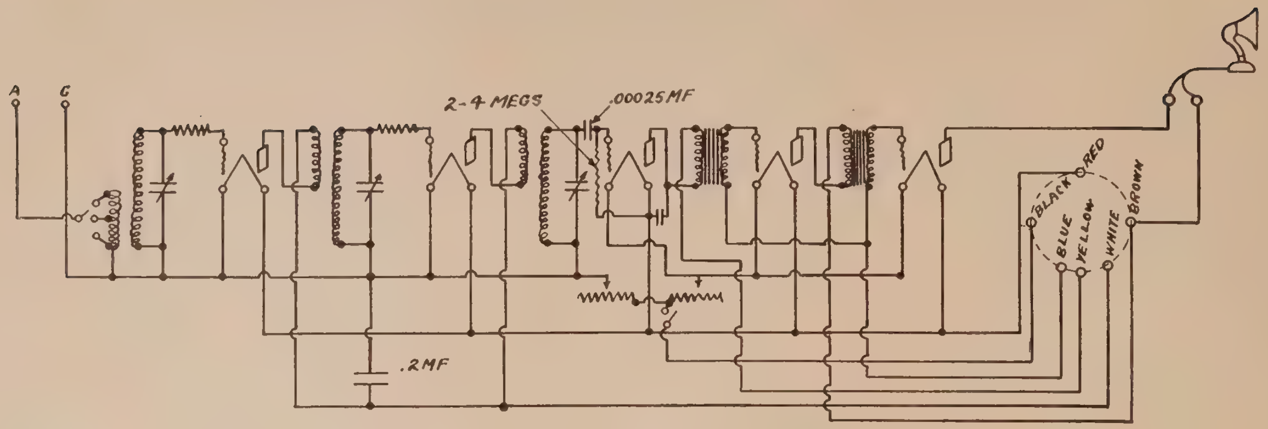

A
G
2-4 MEGS
.00025MF
.2MF
BLACK
RED
BLUE
YELLOW
WHITE
BROWN

Fig. 51. Diagram of Model 20 Compact No. 7570.

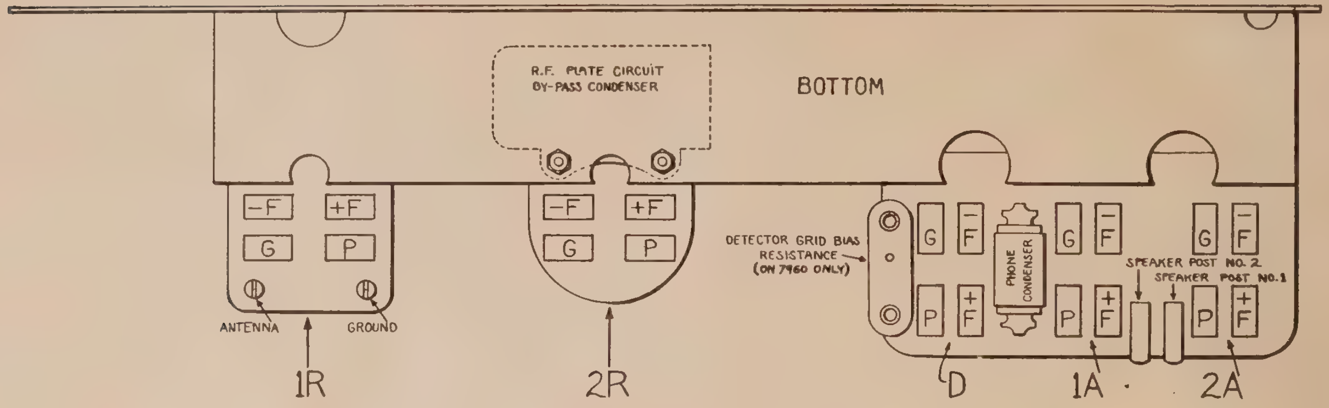

R.F. PLATE CIRCUIT
BY-PASS CONDENSER
BOTTOM
−F
+F
G
P
ANTENNA
GROUND
1R
2R
DETECTOR GRID BIAS RESISTANCE (ON 7960 ONLY)
PHONE CONDENSER
SPEAKER POST NO. 2
SPEAKER POST NO. 1
D
1A
2A

Fig. 52. Chart for Model 20 Compact (Both Types).

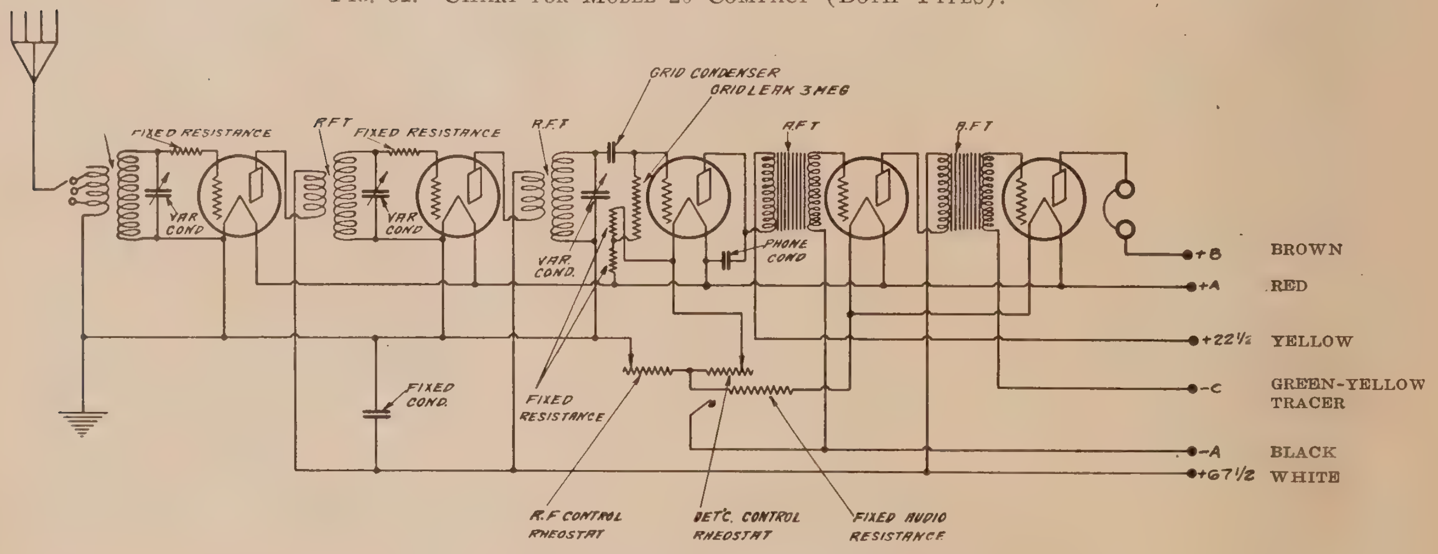

GRID CONDENSER
GRIDLEAK 3MEG
FIXED RESISTANCE
R.F.T
FIXED RESISTANCE
R.F.T
A.F.T
A.F.T
VAR COND
VAR COND
VAR COND.
PHONE COND
FIXED COND.
FIXED RESISTANCE
+B
BROWN
+A
RED
+22½
YELLOW
−C
GREEN-YELLOW TRACER
−A
BLACK
+67½
WHITE
R.F CONTROL RHEOSTAT
DET'C. CONTROL RHEOSTAT
FIXED AUDIO RESISTANCE

Fig. 53. Diagram of Model 20 Compact No. 7960.
See Fig. 66 for rheostat connections.

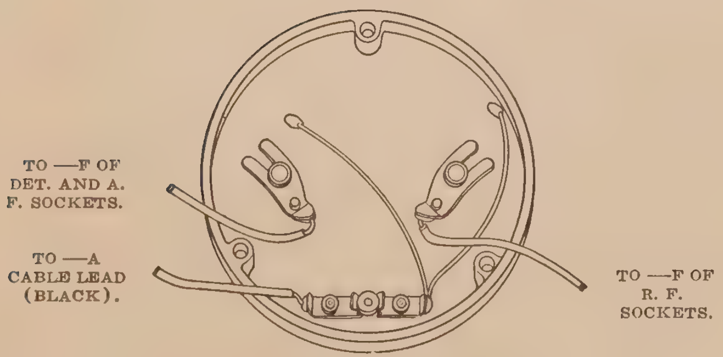

TO —F OF DET. AND A. F. SOCKETS.
TO —A CABLE LEAD (BLACK).
TO —F OF R. F. SOCKETS.

Fig. 54. Rear View of Double Rheostat and Filament Switch Assembly Used in Model 20 (No. 4640-7570), 19 and 21.

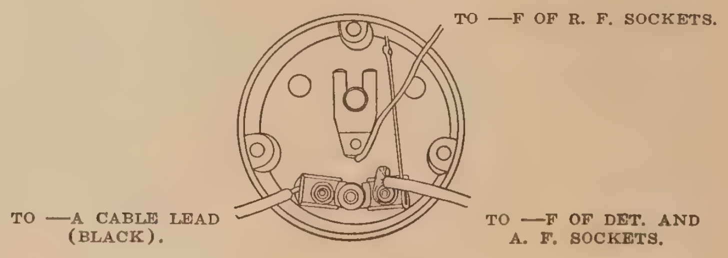

TO —F OF R. F. SOCKETS.
TO —A CABLE LEAD (BLACK).
TO —F OF DET. AND A. F. SOCKETS.

Fig. 55. Rear View of Rheostat and Filament Switch Assembly Used in Model 35.

R. F. ASSEMBLIES IN MODEL 30, 32, 35 AND 48

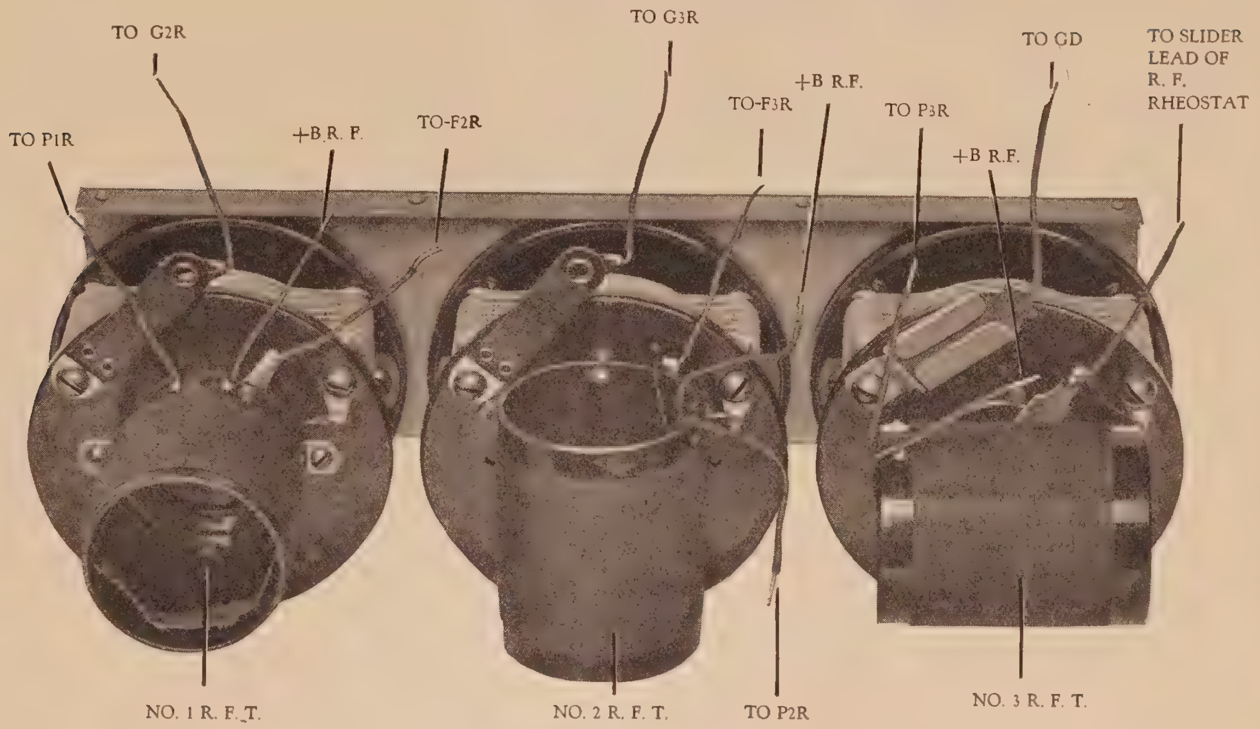

TO G2R
TO G3R
TO GD
TO SLIDER LEAD OF R. F. RHEOSTAT
+B R.F.
TO-F3R
TO P3R
TO P1R
+B R. F.
TO-F2R
+B R.F.
NO. 1 R. F. T.
NO. 2 R. F. T.
TO P2R
NO. 3 R. F. T.

Fig. 56.
View of Sub-Panel Assembly
Model 30
(Early Type).

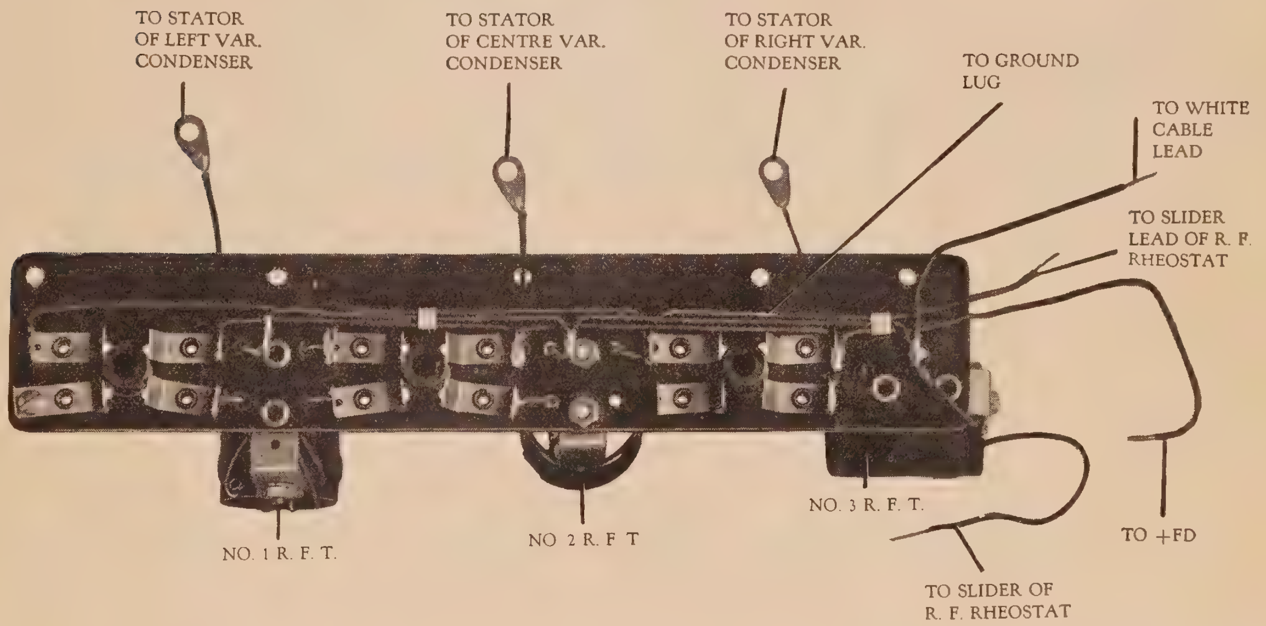

TO STATOR OF LEFT VAR. CONDENSER
TO STATOR OF CENTRE VAR. CONDENSER
TO STATOR OF RIGHT VAR. CONDENSER
TO GROUND LUG
TO WHITE CABLE LEAD
TO SLIDER LEAD OF R. F. RHEOSTAT
NO. 3 R. F. T.
TO +FD
NO 2 R. F T
NO. 1 R. F. T.
TO SLIDER OF R. F. RHEOSTAT

Fig. 57.
View of R. F. Amplifier Assembly in
Model 30
(Later Type),
35 and 48.

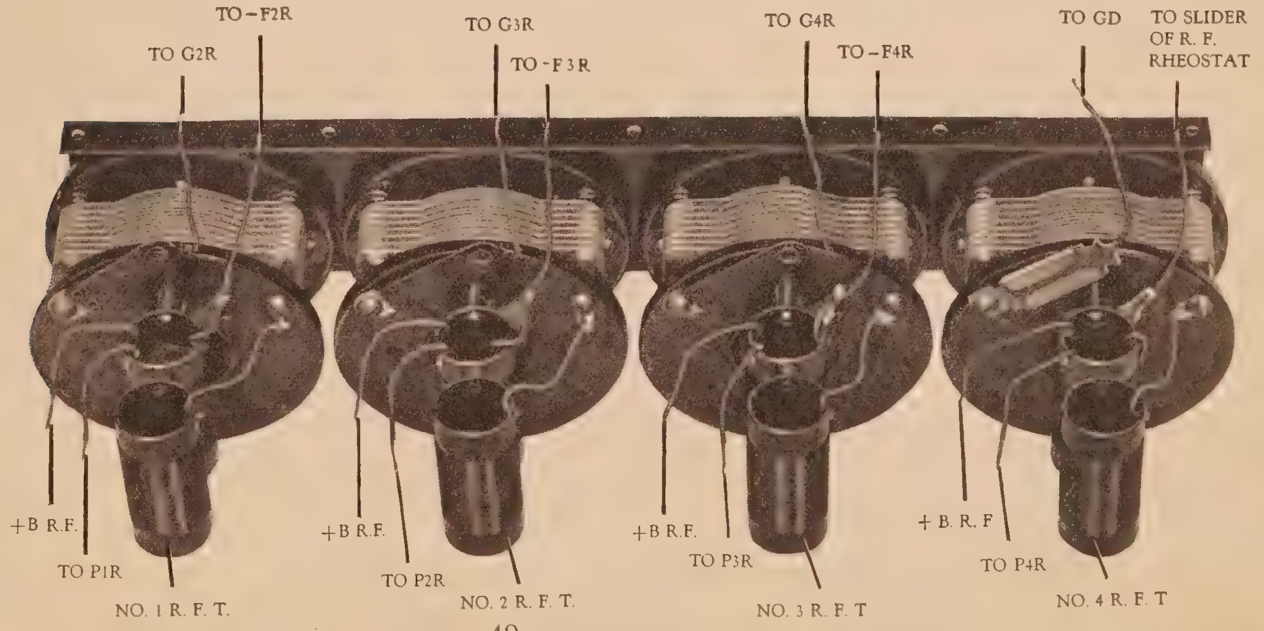

TO –F2R
TO G2R
TO G3R
TO -F3R
TO G4R
TO –F4R
TO GD
TO SLIDER OF R. F. RHEOSTAT
+B R.F.
TO P1R
NO. 1 R. F. T.
+B R.F.
TO P2R
NO. 2 R. F. T.
+B R.F.
TO P3R
NO. 3 R. F. T
+ B. R. F
TO P4R
NO. 4 R. F. T

Fig. 58.
View of Sub-Panel Assembly
Model 32.

MODEL 30, 32, 35 AND 48

See Figs. 55 and 66 for rheostat connections.

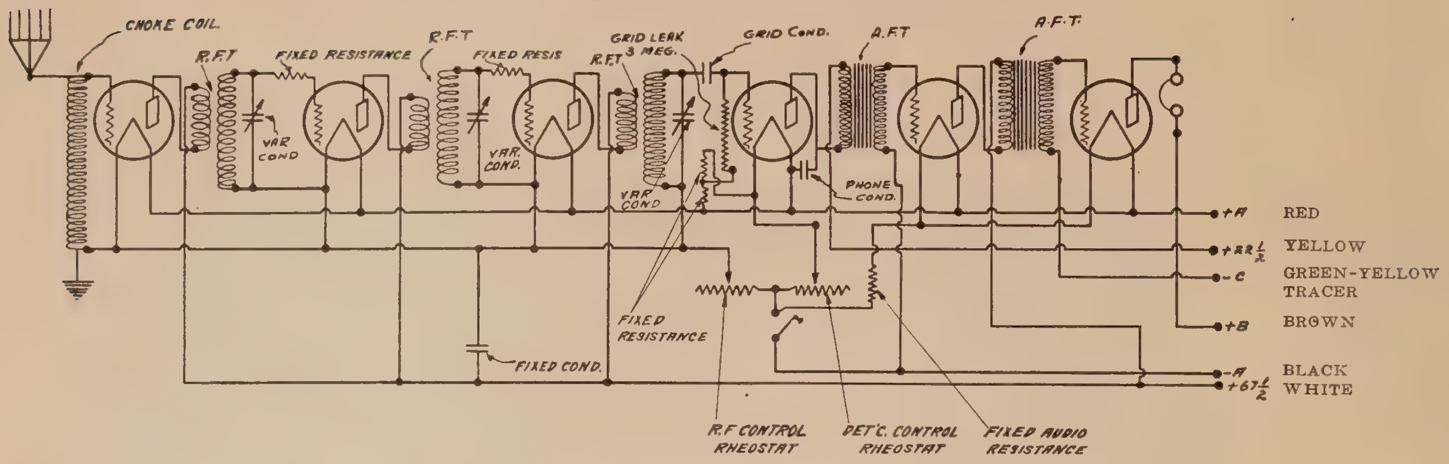

CHOKE COIL
R.F.T
FIXED RESISTANCE
VAR COND
R.F.T
FIXED RESIS
VAR. COND.
GRID LEAK 3 MEG.
R.F.T
VAR COND
GRID COND.
A.F.T
PHONE COND.
A.F.T.
FIXED COND.
FIXED RESISTANCE
R.F CONTROL RHEOSTAT
DET'C. CONTROL RHEOSTAT
FIXED AUDIO RESISTANCE
+A RED
+22½ YELLOW
-C GREEN-YELLOW TRACER
+B BROWN
-A BLACK
+67½ WHITE

Fig. 59. Wiring Diagram of Model 30, 35 and 48.

In Model 35, one rheostat controls the three R. F. filaments and a fixed resistor is connected in series with the detector and two A. F. filaments.

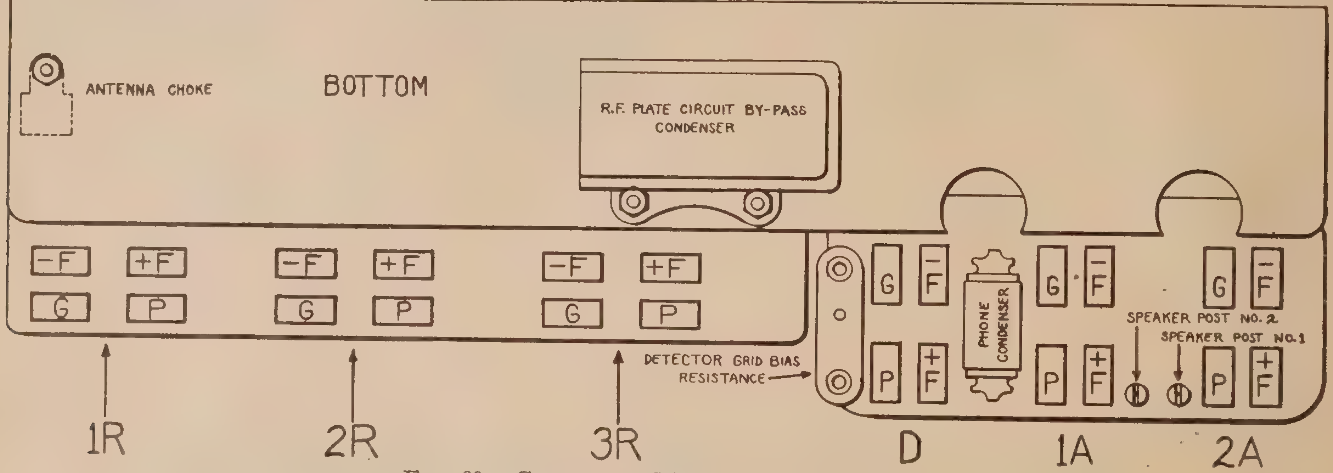

ANTENNA CHOKE
BOTTOM
R.F. PLATE CIRCUIT BY-PASS CONDENSER
-F
+F
G
P
-F
+F
G
P
-F
+F
G
P
DETECTOR GRID BIAS RESISTANCE
G
F
P
+F
PHONE CONDENSER
G
F
P
+F
SPEAKER POST NO. 2
SPEAKER POST NO. 1
G
F
P
+F
1R
2R
3R
D
1A
2A

Fig. 60. Chart for Model 30, 35 and 48.

Early Model 30 Sets have separate R. F. sockets, but the socket contacts are in same relative position as shown in above chart.

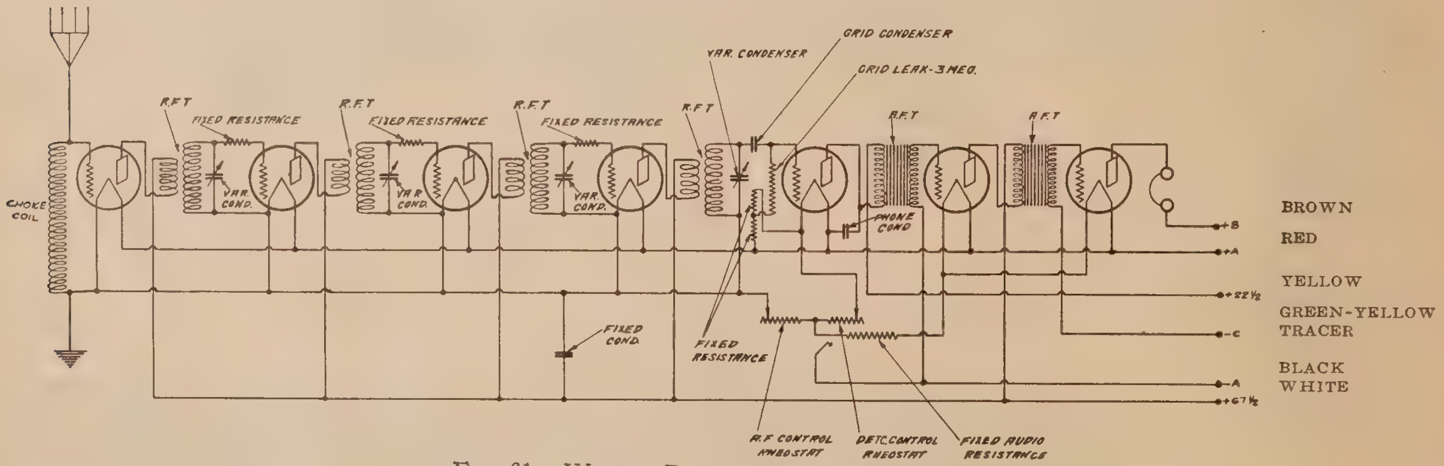

GRID CONDENSER
VAR. CONDENSER
GRID LEAK-3 MEG.
R.F.T
FIXED RESISTANCE
R.F.T
FIXED RESISTANCE
R.F.T
FIXED RESISTANCE
R.F.T
A.F.T
A.F.T
CHOKE COIL
VAR. COND.
VAR. COND.
VAR. COND.
PHONE COND
FIXED COND.
FIXED RESISTANCE
R.F CONTROL RHEOSTAT
DET'C.CONTROL RHEOSTAT
FIXED AUDIO RESISTANCE
+B BROWN
+A RED
+22½ YELLOW
-C GREEN-YELLOW TRACER
-A BLACK
+67½ WHITE

Fig. 61. Wiring Diagram of Model 32.

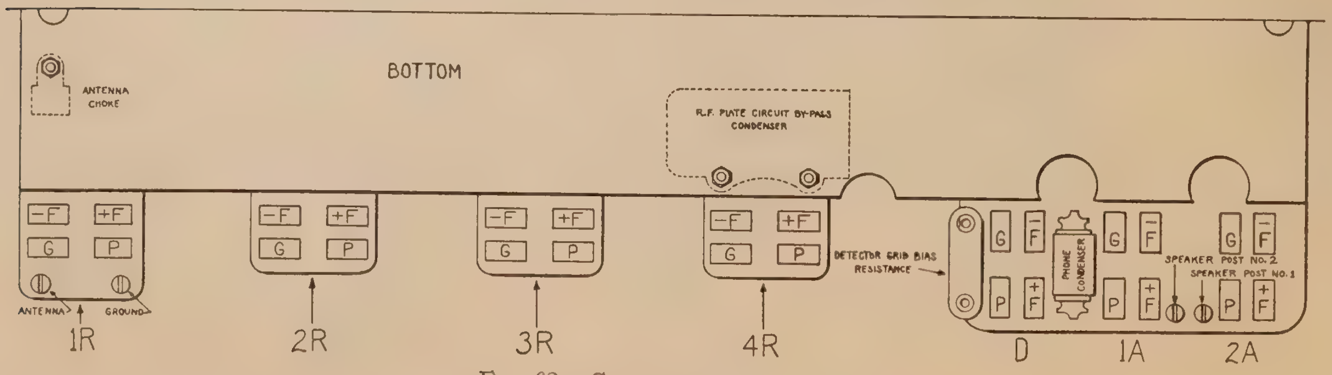

ANTENNA CHOKE
BOTTOM
R.F. PLATE CIRCUIT BY-PASS CONDENSER
-F
+F
G
P
ANTENNA
GROUND
-F
+F
G
P
-F
+F
G
P
-F
+F
G
P
DETECTOR GRID BIAS RESISTANCE
G
F
P
+F
PHONE CONDENSER
G
F
P
+F
SPEAKER POST NO. 2
SPEAKER POST NO. 1
G
F
P
+F
1R
2R
3R
4R
D
1A
2A

Fig. 62. Chart for Model 32.

MODEL 33 AND 49

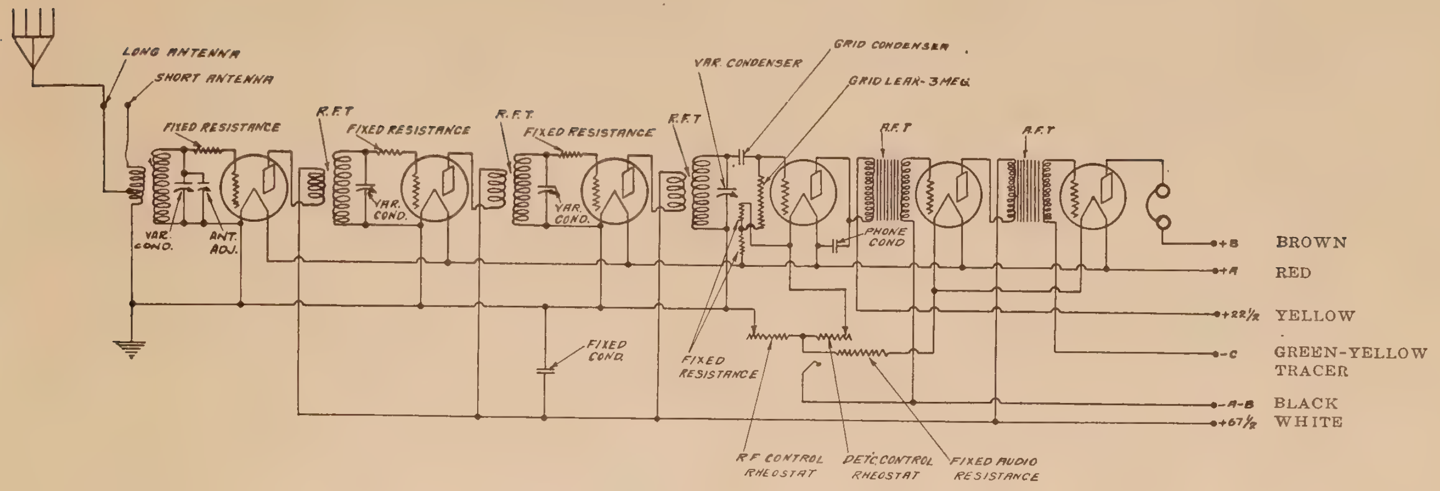

LONG ANTENNA
SHORT ANTENNA
FIXED RESISTANCE
VAR. COND.
ANT. ADJ.
R.F.T
FIXED RESISTANCE
VAR. COND.
R.F.T.
FIXED RESISTANCE
VAR. COND.
R.F.T
VAR. CONDENSER
GRID CONDENSER
GRID LEAK-3 MEG.
R.F.T
R.F.T
PHONE COND
+B BROWN
+A RED
+22½ YELLOW
-C GREEN-YELLOW TRACER
-A-B BLACK
+67½ WHITE
FIXED COND.
FIXED RESISTANCE
R.F. CONTROL RHEOSTAT
DET. CONTROL RHEOSTAT
FIXED AUDIO RESISTANCE

Fig. 63. Wiring Diagram—Model 33 and 49.

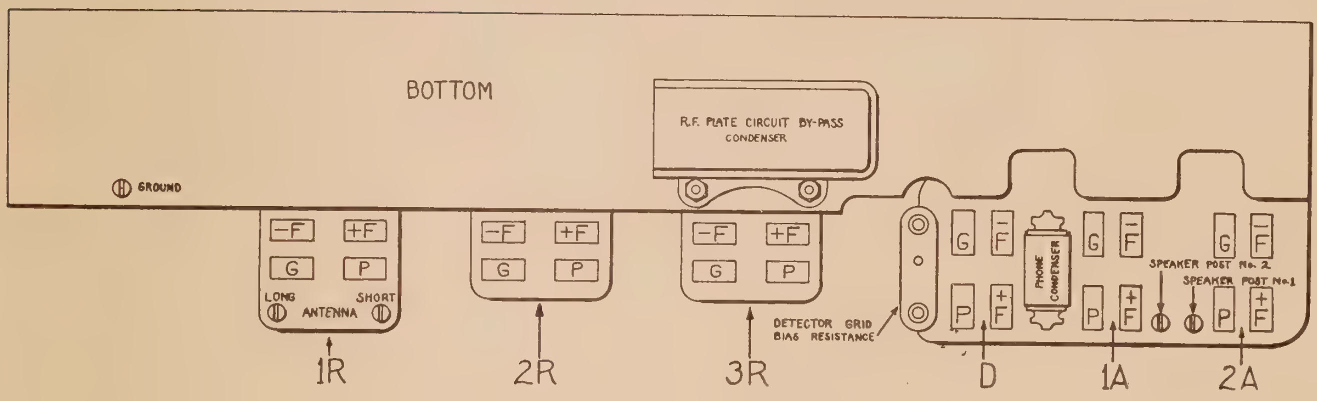
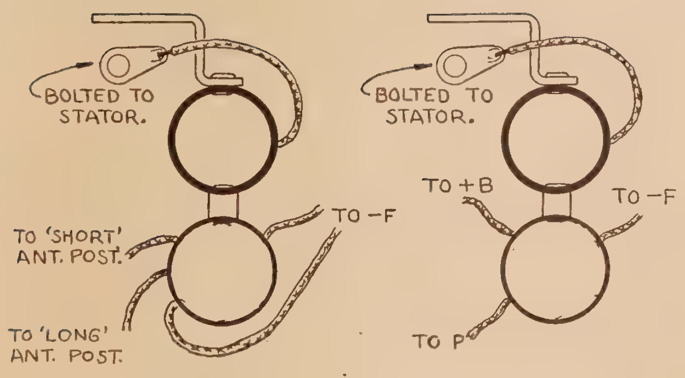

BOTTOM
R.F. PLATE CIRCUIT BY-PASS CONDENSER
GROUND
−F
+F
G
P
LONG
ANTENNA
SHORT
DETECTOR GRID BIAS RESISTANCE
PHONE CONDENSER
SPEAKER POST No. 2
SPEAKER POST No. 1
1R
2R
3R
D
1A
2A

Fig. 64. Testing Chart—Model 33 and 49.

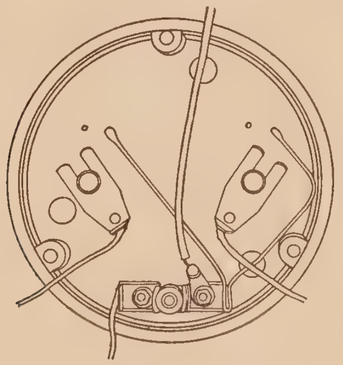

BOLTED TO STATOR.
TO 'SHORT' ANT. POST.
TO 'LONG' ANT. POST.
TO −F
BOLTED TO STATOR.
TO +B
TO −F
TO P

ANT. TRANS.

NO. 1, 2, 3 R.F.T.

Fig. 65. Sketch Showing How Leads From Antenna Transformer and From R. F. Transformers Are Connected in Model 33 and 49.

GREEN COVERED LEAD (FIXED RESISTANCE) TO —F CONTACTS OF A. F. SOCKETS.



TO —F OF DET. SOCKET.

TO —F CONTACTS OF R. F. SOCKETS.

TO —A (BLACK) CABLE LEAD.

Fig. 66. Rear View of Double Rheostat and Filament Switch Assembly Used in Model 20 Compact (No. 7960), 30 (Early Type), 32, 33, 48, 49 and 50.

The appearance of the rheostat in later Model 30 sets, and in Model 48 and 50, is slightly different from that shown above, but the connections are similar.

MODEL 36 BELOW SERIAL No. 2,610,000

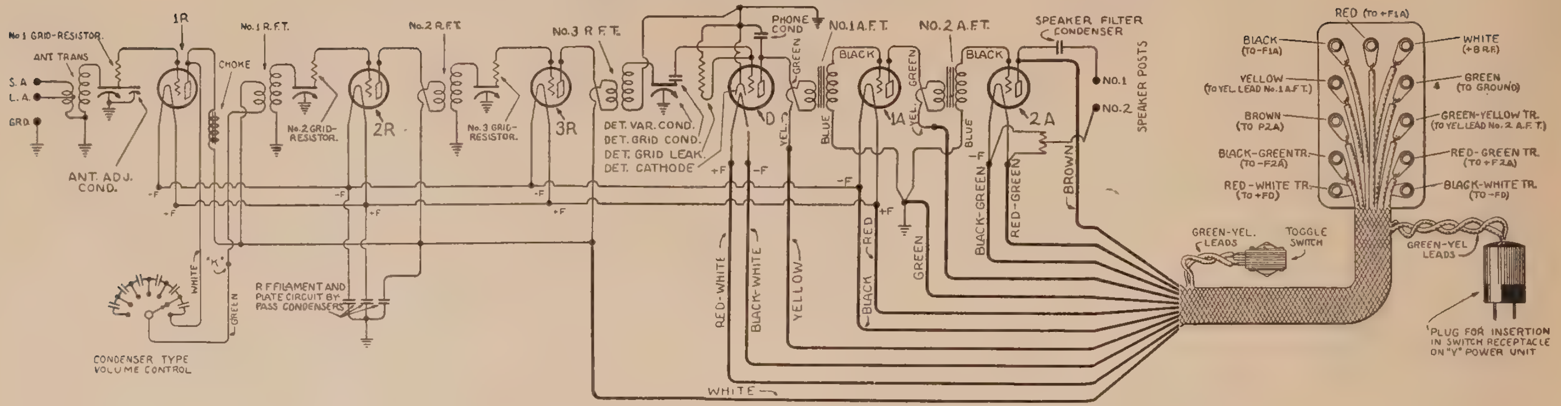

No 1 GRID-RESISTOR
ANT TRANS
S. A
L. A.
GRD.
ANT. ADJ. COND.
1R
No. 1 R.F.T.
CHOKE
No. 2 GRID-RESISTOR.
2R
No. 2 R.F.T.
No. 3 GRID-RESISTOR.
3R
No. 3 R F. T.
DET. VAR. COND.
DET. GRID COND.
DET. GRID LEAK.
DET. CATHODE
PHONE COND
D
No. 1 A.F. T.
BLACK
GREEN
YEL.
BLUE
1A
No. 2 A.F.T.
2A
SPEAKER FILTER CONDENSER
No. 1
No. 2
SPEAKER POSTS
+F
-F
"K"
WHITE
GREEN
R F FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
CONDENSER TYPE VOLUME CONTROL
RED-WHITE
BLACK-WHITE
YELLOW
RED
BLACK
BLACK-GREEN
RED-GREEN
BROWN
WHITE
RED (TO +F1A)
BLACK (TO -F1A)
WHITE (+B R.F.)
YELLOW (TO YEL. LEAD No. 1 A.F.T.)
GREEN (TO GROUND)
BROWN (TO P2A)
GREEN-YELLOW TR. (TO YEL. LEAD No. 2 A.F.T.)
BLACK-GREEN TR. (TO -F2A)
RED-GREEN TR. (TO +F2A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
GREEN-YEL. LEADS
TOGGLE SWITCH
GREEN-YEL LEADS
PLUG FOR INSERTION IN SWITCH RECEPTACLE ON "Y" POWER UNIT

Fig. 67. Wiring Diagram of Model 36 With Condenser-Type Volume Control.

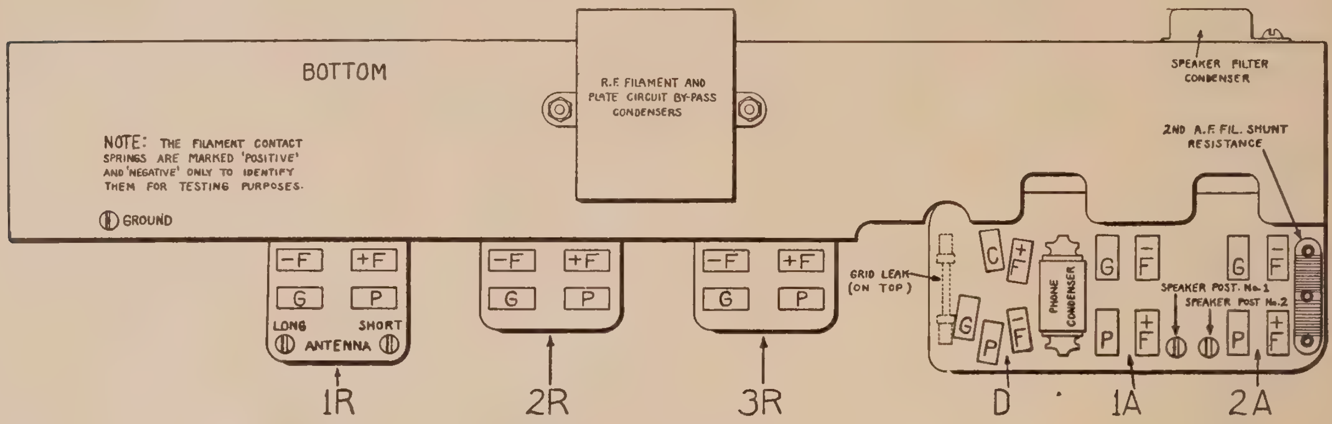

BOTTOM
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
SPEAKER FILTER CONDENSER
NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED 'POSITIVE' AND 'NEGATIVE' ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
2ND A.F. FIL. SHUNT RESISTANCE
GROUND
-F
+F
G
P
LONG
SHORT
ANTENNA
GRID LEAK (ON TOP)
C
PHONE CONDENSER
SPEAKER POST. No. 1
SPEAKER POST No. 2
1R
2R
3R
D
1A
2A

Fig. 68. Chart for Model 36.

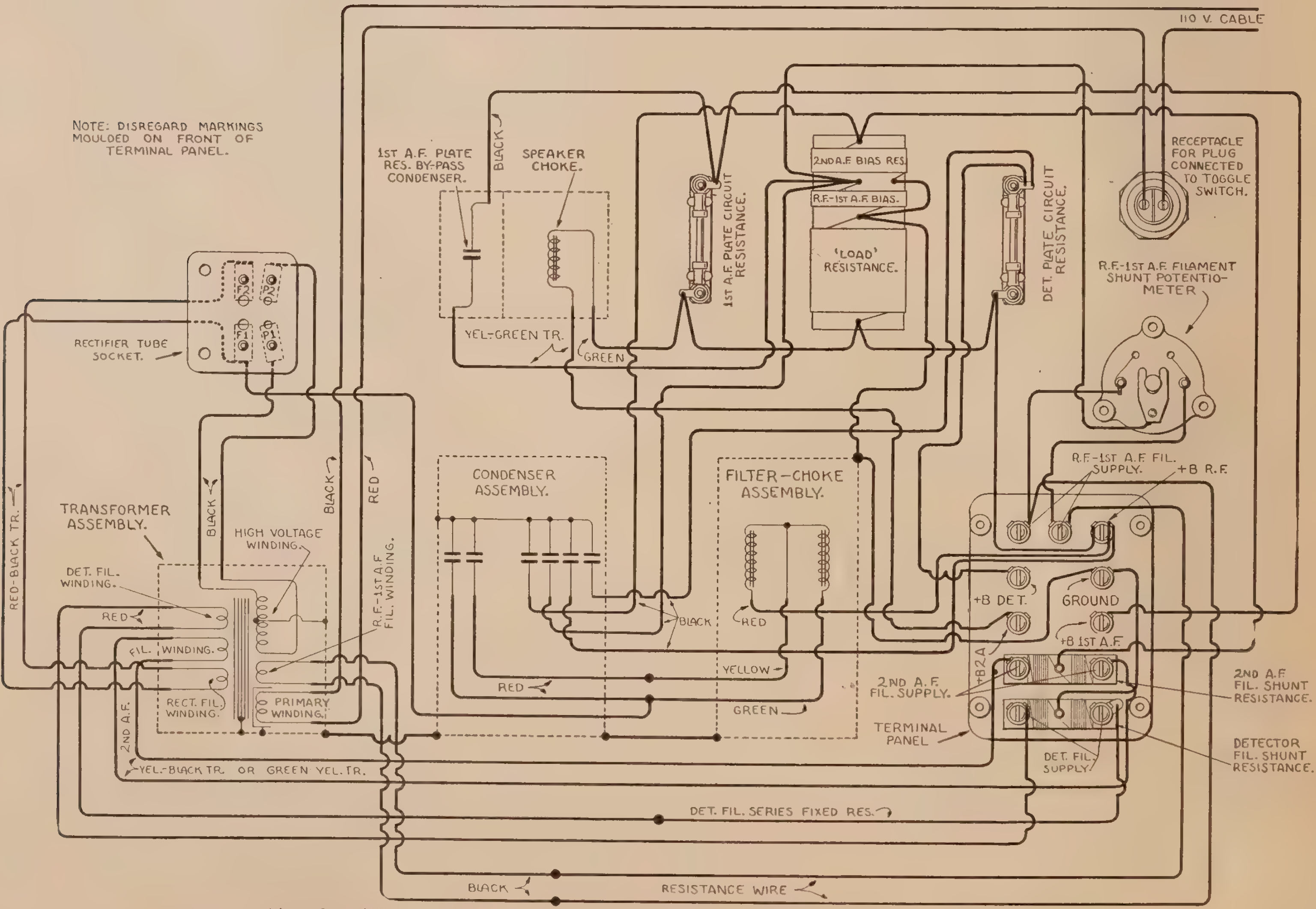

110 V. CABLE
NOTE: DISREGARD MARKINGS MOULDED ON FRONT OF TERMINAL PANEL.
1ST A.F. PLATE RES. BY-PASS CONDENSER.
BLACK
SPEAKER CHOKE.
1ST A.F. PLATE CIRCUIT RESISTANCE.
2ND A.F. BIAS RES.
R.F.-1ST A.F. BIAS.
'LOAD' RESISTANCE.
DET. PLATE CIRCUIT RESISTANCE.
RECEPTACLE FOR PLUG CONNECTED TO TOGGLE SWITCH.
R.F.-1ST A.F. FILAMENT SHUNT POTENTIOMETER
RECTIFIER TUBE SOCKET.
F2
P2
F1
P1
YEL-GREEN TR.
GREEN
RED-BLACK TR.
TRANSFORMER ASSEMBLY.
BLACK
RED
HIGH VOLTAGE WINDING.
DET. FIL. WINDING.
FIL. WINDING.
R.F.-1ST A.F. FIL. WINDING.
RECT. FIL. WINDING.
PRIMARY WINDING.
2ND A.F.
YEL.-BLACK TR. OR GREEN YEL. TR.
CONDENSER ASSEMBLY.
FILTER-CHOKE ASSEMBLY.
YELLOW
GREEN
R.F.-1ST A.F. FIL. SUPPLY.
+B R.F.
+B DET.
GROUND
+B 1ST A.F.
+B2A
2ND A.F. FIL. SUPPLY.
TERMINAL PANEL
DET. FIL. SUPPLY.
2ND A.F. FIL. SHUNT RESISTANCE.
DETECTOR FIL. SHUNT RESISTANCE.
DET. FIL. SERIES FIXED RES.
RESISTANCE WIRE

Fig. 69. Wiring Diagram of "Y" Power Unit Below Serial No. 260,000.

MODEL 36 ABOVE SERIAL No. 2,610,000

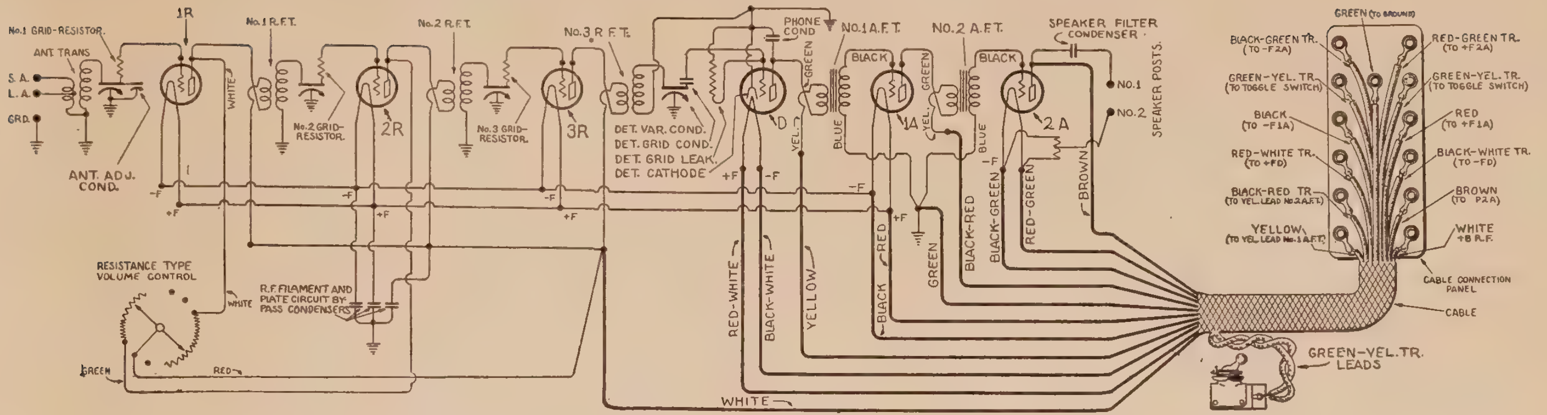
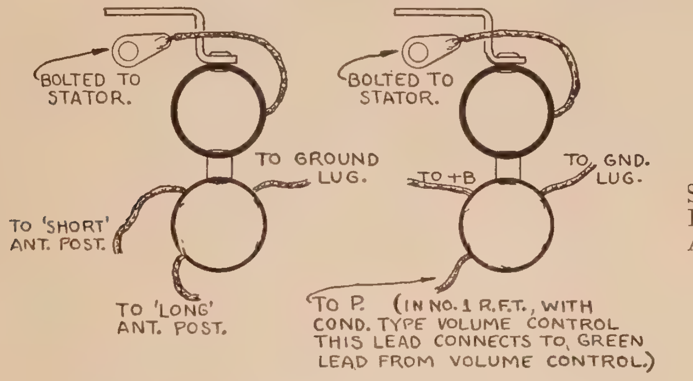

No.1 GRID-RESISTOR.
ANT TRANS
S.A.
L.A.
GRD.
ANT. ADJ. COND.
1R
No.1 R.F.T.
WHITE
No.2 GRID-RESISTOR.
2R
No.2 R.F.T.
No.3 GRID-RESISTOR.
3R
No.3 R.F.T.
DET. VAR. COND.
DET. GRID COND.
DET. GRID LEAK.
DET. CATHODE
PHONE COND
D
GREEN
YEL.
No.1 A.F.T.
BLACK
BLUE
1A
GREEN
YEL.
No.2 A.F.T.
BLACK
BLUE
2 A
SPEAKER FILTER CONDENSER
No.1
No.2
SPEAKER POSTS.
-F
+F
RESISTANCE TYPE VOLUME CONTROL
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
WHITE
GREEN
RED
RED-WHITE
BLACK-WHITE
YELLOW
BLACK
RED
GREEN
BLACK-RED
BLACK-GREEN
RED-GREEN
BROWN
WHITE
GREEN (TO GROUND)
BLACK-GREEN TR. (TO -F 2A)
RED-GREEN TR. (TO +F 2A)
GREEN-YEL. TR. (TO TOGGLE SWITCH)
GREEN-YEL. TR. (TO TOGGLE SWITCH)
BLACK (TO -F 1A)
RED (TO +F 1A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
BLACK-RED TR. (TO YEL. LEAD No.2 A.F.T.)
BROWN (TO P2A)
YELLOW (TO YEL. LEAD No.1 A.F.T.)
WHITE +B R.F.
CABLE CONNECTION PANEL
CABLE
GREEN-YEL. TR. LEADS

FIG. 70. WIRING DIAGRAM OF MODEL 36 WITH RESISTANCE-TYPE VOLUME CONTROL.


BOLTED TO STATOR.
TO GROUND LUG.
TO 'SHORT' ANT. POST.
TO 'LONG' ANT. POST.
BOLTED TO STATOR.
TO +B
TO GND. LUG.
TO P. (IN NO. 1 R.F.T., WITH COND. TYPE VOLUME CONTROL THIS LEAD CONNECTS TO GREEN LEAD FROM VOLUME CONTROL.)

ANT. TRANS. NO. 1, 2, 3, R.F.T.

FIG. 71. SKETCH SHOWING CONNECTIONS FROM ANTENNA TRANSFORMER AND FROM R. F. TRANSFORMERS IN MODEL 36.

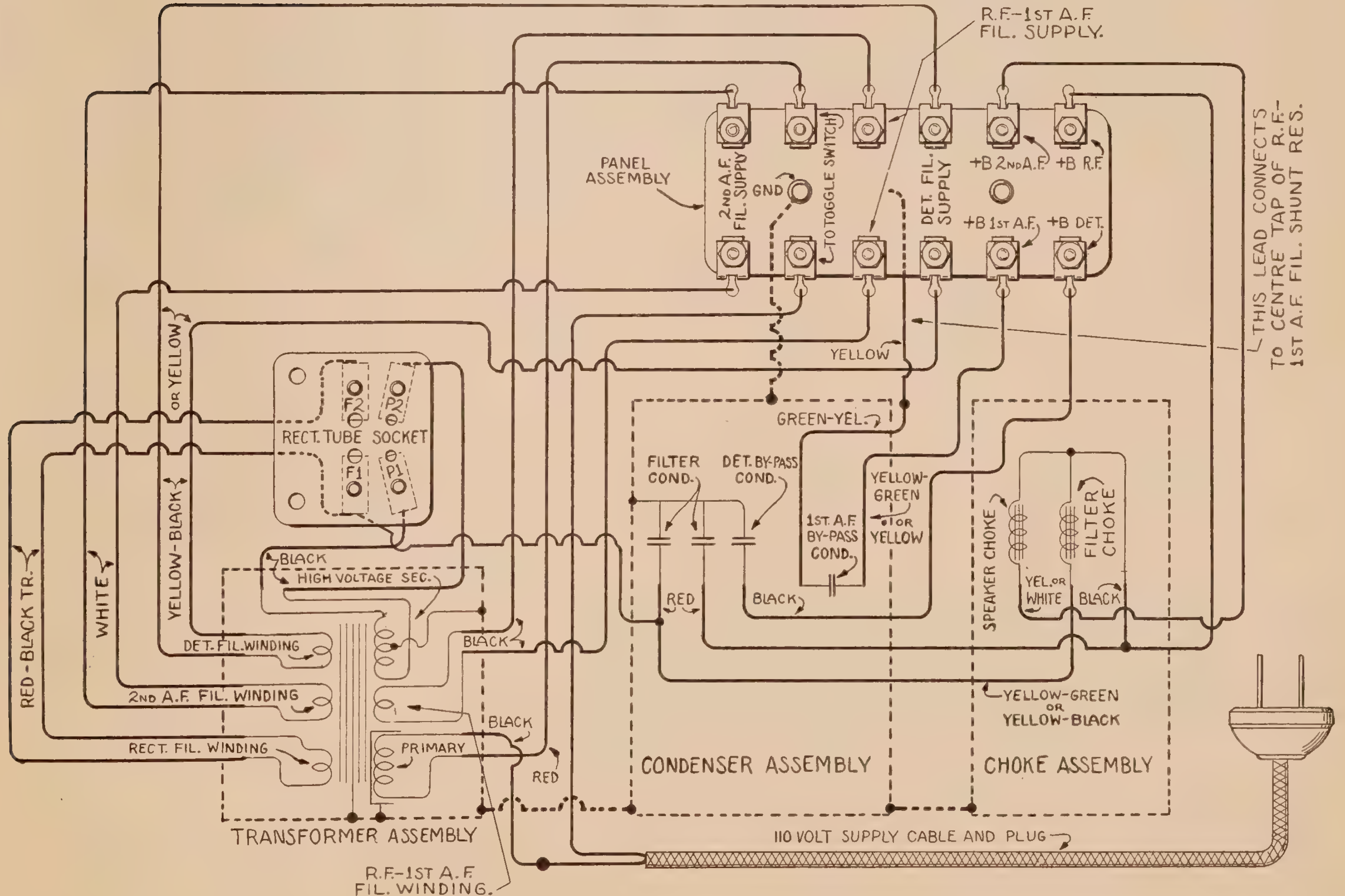

R.F.-1ST A.F. FIL. SUPPLY.
PANEL ASSEMBLY
2ND A.F. FIL. SUPPLY
GND
TO TOGGLE SWITCH
DET. FIL. SUPPLY
+B 2ND A.F.
+B R.F.
+B 1ST A.F.
+B DET.
THIS LEAD CONNECTS TO CENTRE TAP OF R.F.-1ST A.F. FIL. SHUNT RES.
YELLOW
OR YELLOW
F2
P2
RECT. TUBE SOCKET
F1
P1
GREEN-YEL.
FILTER COND.
DET. BY-PASS COND.
1ST A.F. BY-PASS COND.
YELLOW-GREEN OR YELLOW
SPEAKER CHOKE
FILTER CHOKE
YEL. OR WHITE
BLACK
RED
BLACK
RED-BLACK TR.
WHITE
YELLOW-BLACK
BLACK
HIGH VOLTAGE SEC.
DET. FIL. WINDING
BLACK
2ND A.F. FIL. WINDING
BLACK
RECT. FIL. WINDING
PRIMARY
RED
YELLOW-GREEN OR YELLOW-BLACK
CONDENSER ASSEMBLY
CHOKE ASSEMBLY
TRANSFORMER ASSEMBLY
110 VOLT SUPPLY CABLE AND PLUG
R.F.-1ST A.F. FIL. WINDING.

FIG. 72. WIRING DIAGRAM OF "Y" POWER UNIT ABOVE SERIAL No. 260,000.

MODEL 37, 37-F, 37-C CHASSIS

For Description of Power Unit, See Pages 56 and 57

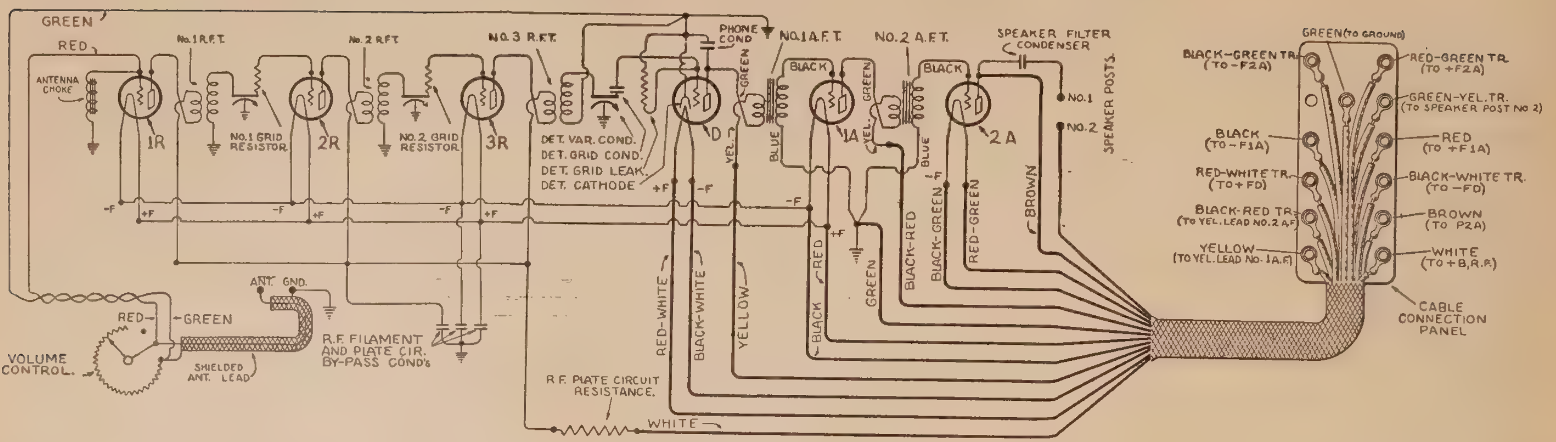

GREEN
RED
ANTENNA CHOKE
No. 1 R.F.T.
No. 2 R.F.T.
NO. 3 R.F.T.
1R
NO. 1 GRID RESISTOR
2R
NO. 2 GRID RESISTOR
3R
DET. VAR. COND.
DET. GRID COND.
DET. GRID LEAK.
DET. CATHODE
PHONE COND
NO. 1 A.F.T.
NO. 2 A.F.T.
SPEAKER FILTER CONDENSER
D
1A
2A
BLACK
BLACK
GREEN
GREEN
YEL.
YEL.
BLUE
BLUE
NO. 1
NO. 2
SPEAKER POSTS
-F
+F
-F
+F
-F
+F
+F
-F
-F
+F
-F
BROWN
RED-GREEN
BLACK-GREEN
BLACK-RED
GREEN
RED
BLACK
YELLOW
BLACK-WHITE
RED-WHITE
ANT. GND.
RED
GREEN
VOLUME CONTROL.
SHIELDED ANT. LEAD
R.F. FILAMENT AND PLATE CIR. BY-PASS COND's
R.F. PLATE CIRCUIT RESISTANCE.
WHITE
GREEN (TO GROUND)
BLACK-GREEN TR. (TO -F2A)
RED-GREEN TR. (TO +F2A)
GREEN-YEL. TR. (TO SPEAKER POST NO 2)
BLACK (TO -F1A)
RED (TO +F1A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
BLACK-RED TR. (TO YEL. LEAD NO. 2 A.F.)
BROWN (TO P2A)
YELLOW (TO YEL. LEAD No. 1 A.F.)
WHITE (TO +B, R.F.)
CABLE CONNECTION PANEL

Fig. 73. Wiring Diagram of Model 37, 37-F, 37-C.

A 2nd-A. F. filament-shunt resistor is used before Serial No. 1,385,000, in which case speaker post No. 2 connects to the centre-tap of this resistor, and the green-yellow tracer lead is not used. The R. F. plate circuit resistor is used after Serial No. 1,385,000.

In Model 37-C the on-off switch is connected to the two terminals on either side of the ground eyelet. A 2nd-A. F. filament-shunt resistor is used in the chassis of all Model 37-C receivers.

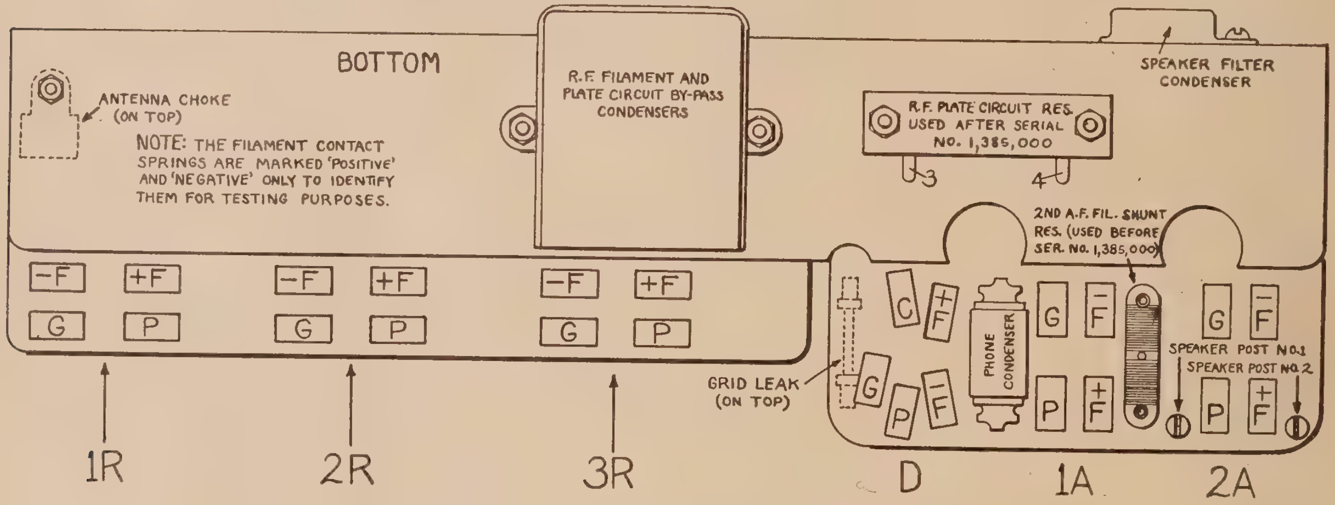

BOTTOM
ANTENNA CHOKE (ON TOP)
NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED 'POSITIVE' AND 'NEGATIVE' ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
SPEAKER FILTER CONDENSER
R.F. PLATE CIRCUIT RES. USED AFTER SERIAL NO. 1,385,000
3
4
2ND A.F. FIL. SHUNT RES. (USED BEFORE SER. NO. 1,385,000)
-F
+F
G
P
-F
+F
G
P
-F
+F
G
P
C
+F
G
P
-F
PHONE CONDENSER
G
-F
P
+F
G
-F
P
+F
GRID LEAK (ON TOP)
SPEAKER POST NO. 1
SPEAKER POST NO. 2
1R
2R
3R
D
1A
2A

Fig. 74. Chart for Model 37, 37-F, 37-C.

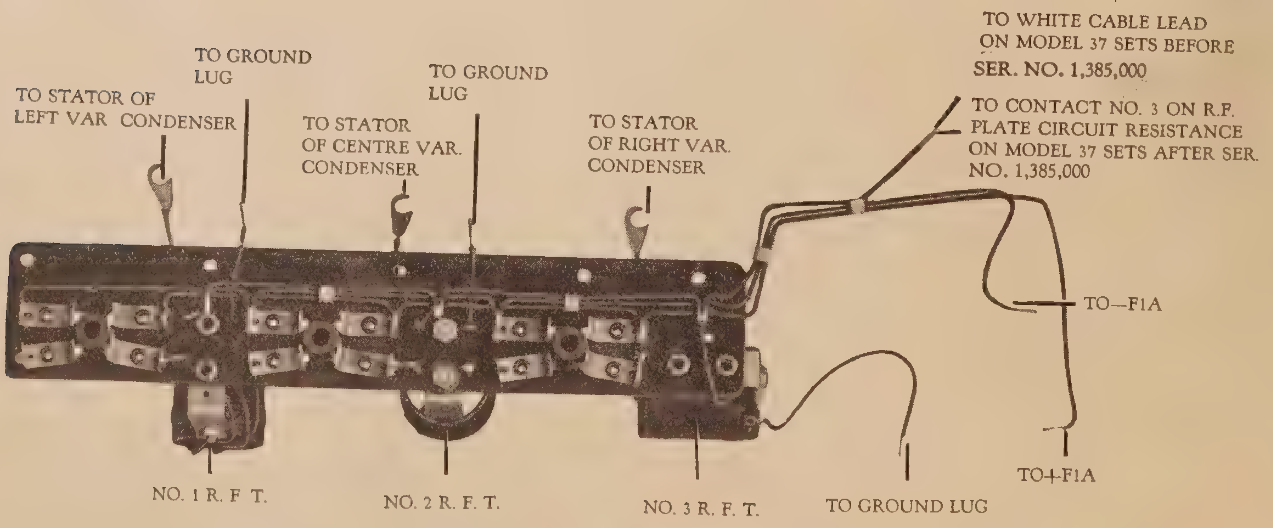

TO STATOR OF LEFT VAR CONDENSER
TO GROUND LUG
TO STATOR OF CENTRE VAR. CONDENSER
TO GROUND LUG
TO STATOR OF RIGHT VAR. CONDENSER
TO WHITE CABLE LEAD ON MODEL 37 SETS BEFORE SER. NO. 1,385,000
TO CONTACT NO. 3 ON R.F. PLATE CIRCUIT RESISTANCE ON MODEL 37 SETS AFTER SER. NO. 1,385,000
TO—F1A
TO+F1A
NO. 1 R. F. T.
NO. 2 R. F. T.
NO. 3 R. F. T.
TO GROUND LUG

Fig. 75. View of R. F. Amplifier.

MODEL 38 CHASSIS

For Description of Power Unit, See Pages 56 and 57

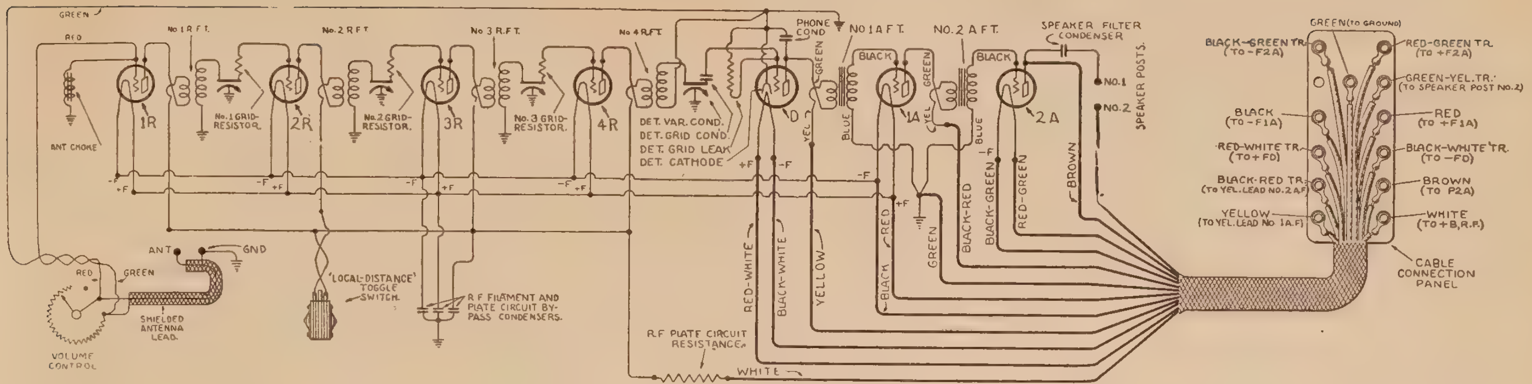

GREEN
RED
No 1 R.F.T.
No. 2 R.F.T.
No 3 R.F.T.
No 4 R.F.T.
1R
2R
3R
4R
D
1A
2A
ANT CHOKE
No. 1 GRID-RESISTOR.
No. 2 GRID-RESISTOR.
No. 3 GRID-RESISTOR.
DET. VAR. COND.
DET. GRID COND.
DET. GRID LEAK
DET. CATHODE
+F
-F
ANT
GND
RED
GREEN
SHIELDED ANTENNA LEAD.
VOLUME CONTROL
'LOCAL-DISTANCE' TOGGLE SWITCH.
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS.
R.F. PLATE CIRCUIT RESISTANCE.
WHITE
PHONE COND
NO 1 A.F.T.
NO. 2 A.F.T.
SPEAKER FILTER CONDENSER
BLACK
GREEN
YEL
BLUE
NO. 1
NO. 2
SPEAKER POSTS.
RED-WHITE
BLACK-WHITE
YELLOW
RED
BLACK
GREEN
BLACK-RED
BLACK-GREEN
RED-GREEN
BROWN
GREEN (TO GROUND)
BLACK-GREEN TR. (TO -F2A)
RED-GREEN TR. (TO +F2A)
GREEN-YEL. TR. (TO SPEAKER POST No. 2)
BLACK (TO -F1A)
RED (TO +F1A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
BLACK-RED TR. (TO YEL. LEAD NO. 2 A.F.)
BROWN (TO P2A)
YELLOW (TO YEL. LEAD No. 1A.F.)
WHITE (TO +B, R.F.)
CABLE CONNECTION PANEL

Fig. 76. Wiring Diagram of Model 38.

A 2nd-A. F. filament-shunt resistor is used before Serial No. 1,752,000 and the green-yellow tracer cable lead is not used. Connections for this resistor are shown in dotted lines in the diagram on page 61. A schematic diagram of the volume control is shown in Fig. 78.

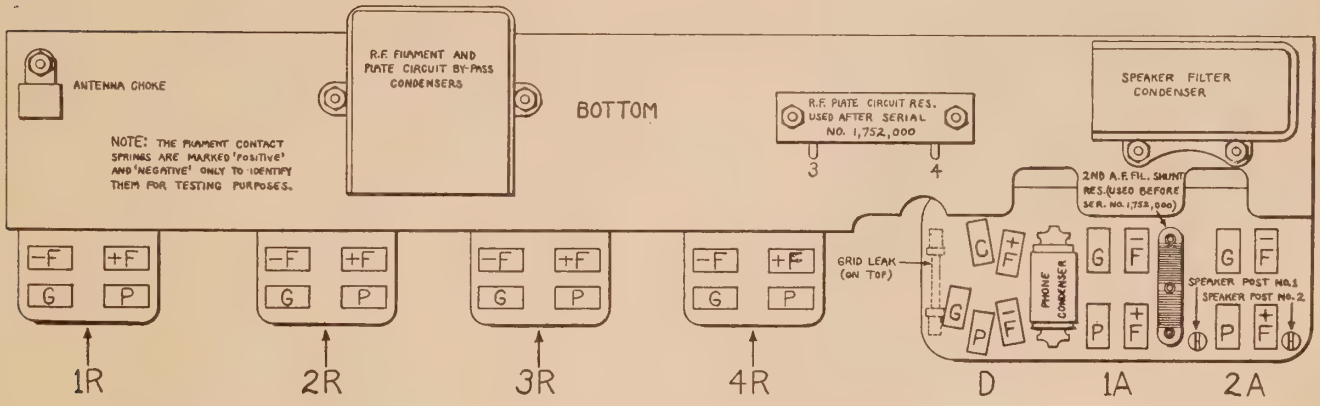

ANTENNA CHOKE
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
BOTTOM
NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED 'POSITIVE' AND 'NEGATIVE' ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
R.F. PLATE CIRCUIT RES. USED AFTER SERIAL NO. 1,752,000
3
4
SPEAKER FILTER CONDENSER
2ND A.F. FIL. SHUNT RES. (USED BEFORE SER. NO. 1,752,000)
GRID LEAK (ON TOP)
PHONE CONDENSER
SPEAKER POST NO. 1
SPEAKER POST NO. 2
-F
+F
G
P
C
1R
2R
3R
4R
D
1A
2A

Fig. 77. Chart for Model 38.

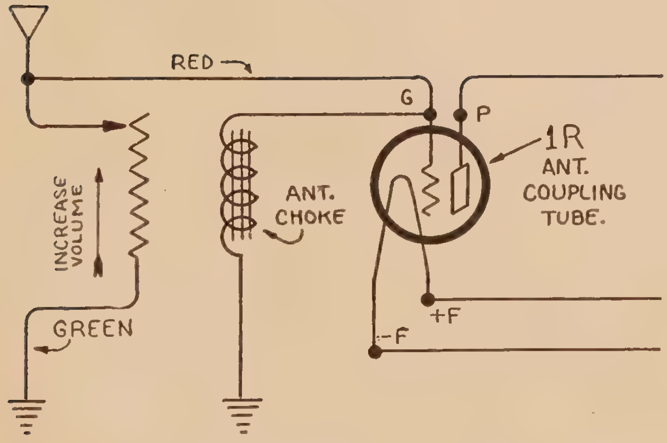

RED
G
P
1R ANT. COUPLING TUBE.
ANT. CHOKE
INCREASE VOLUME
GREEN
+F
-F

Fig. 78. Schematic Diagram of Volume Control in Model 37, 37-F, 37-C and 38.

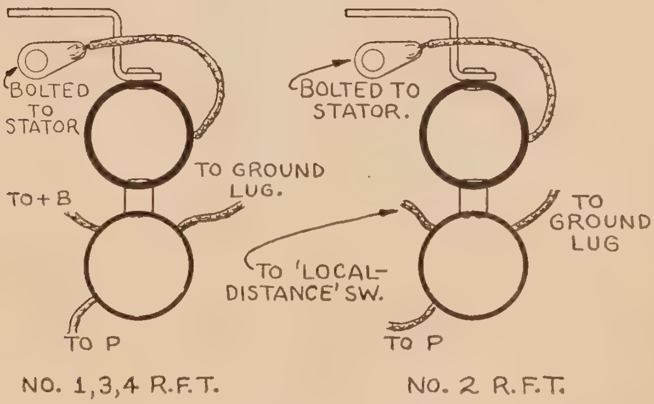

BOLTED TO STATOR
TO GROUND LUG.
TO + B
TO P
NO. 1,3,4 R.F.T.
BOLTED TO STATOR.
TO GROUND LUG
TO 'LOCAL-DISTANCE' SW.
TO P
NO. 2 R.F.T.

Fig. 79. Sketch Showing Connections From R. F. Transformers, Model 38.

POWER UNIT IN MODEL 37, 37-F, 37-C AND 38

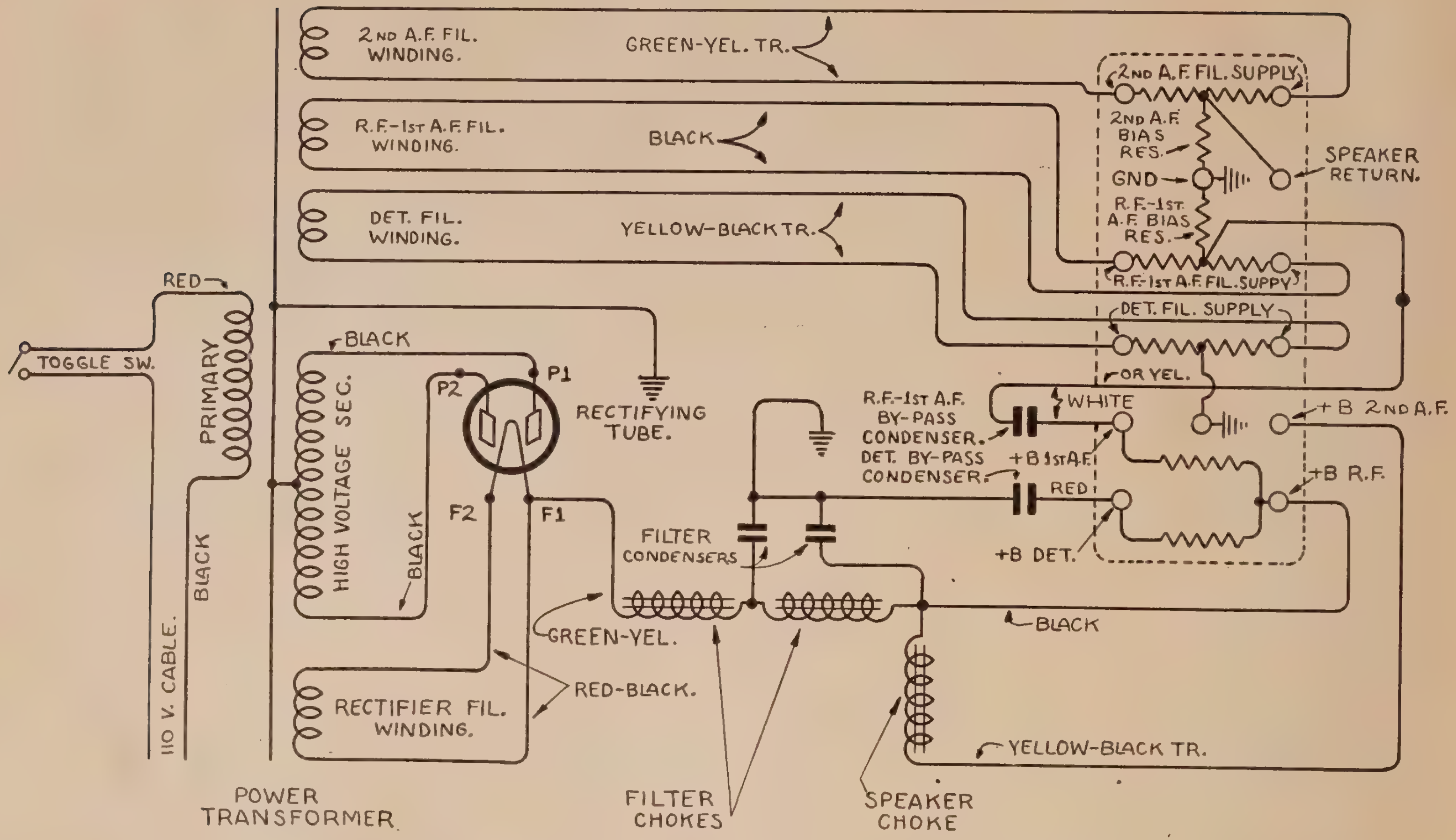
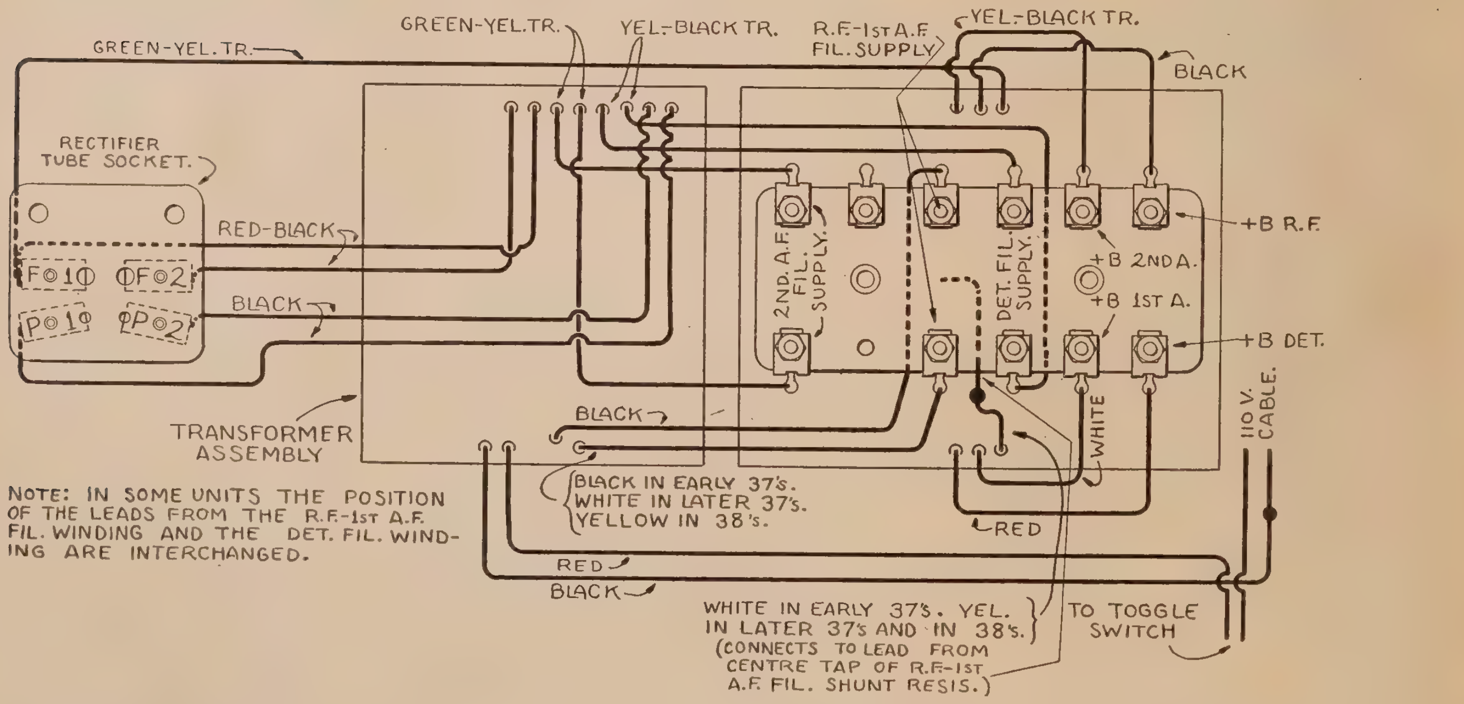

2ND A.F. FIL. WINDING.
GREEN-YEL. TR.
R.F.-1ST A.F. FIL. WINDING.
BLACK
DET. FIL. WINDING.
YELLOW-BLACK TR.
2ND A.F. FIL. SUPPLY
2ND A.F. BIAS RES.
GND
SPEAKER RETURN.
R.F.-1ST. A.F. BIAS RES.
R.F.-1ST A.F. FIL. SUPPY
DET. FIL. SUPPLY
OR YEL.
RED
TOGGLE SW.
PRIMARY
BLACK
P1
P2
RECTIFYING TUBE.
HIGH VOLTAGE SEC.
BLACK
F2
F1
R.F.-1ST A.F. BY-PASS CONDENSER.
WHITE
+B 2ND A.F.
DET. BY-PASS CONDENSER
+B 1ST A.F.
RED
+B R.F.
FILTER CONDENSERS
+B DET.
BLACK
110 V. CABLE.
BLACK
GREEN-YEL.
RED-BLACK.
RECTIFIER FIL. WINDING.
YELLOW-BLACK TR.
POWER TRANSFORMER
FILTER CHOKES
SPEAKER CHOKE

Fig. 80. Diagram of Power Unit in Model 37, 37-F, 37-C and 38.
In Model 37-C the on-off switch connections are made to the panel assembly as explained under Fig. 82.


GREEN-YEL. TR.
GREEN-YEL. TR.
YEL-BLACK TR.
R.F.-1ST A.F. FIL. SUPPLY
YEL-BLACK TR.
BLACK
RECTIFIER TUBE SOCKET.
RED-BLACK
F○1
F○2
BLACK
P○1
P○2
2ND. A.F. FIL. SUPPLY.
DET. FIL. SUPPLY.
+B R.F.
+B 2ND A.
+B 1ST A.
+B DET.
TRANSFORMER ASSEMBLY
BLACK
WHITE
110 V. CABLE.
BLACK IN EARLY 37's. WHITE IN LATER 37's. YELLOW IN 38's.
RED
RED
BLACK
WHITE IN EARLY 37's. YEL. IN LATER 37's AND IN 38's. (CONNECTS TO LEAD FROM CENTRE TAP OF R.F.-1ST A.F. FIL. SHUNT RESIS.)
TO TOGGLE SWITCH

NOTE: IN SOME UNITS THE POSITION OF THE LEADS FROM THE R.F.-1ST A.F. FIL. WINDING AND THE DET. FIL. WINDING ARE INTERCHANGED.

Fig. 81. Showing Connections From Transformer and Condenser-Choke Assemblies to Panel Assembly.
This view shows the approximate position of leads from the metal containers. In replacement condenser-choke assemblies for Model 38 the lead to +B 1st-A. F. terminal is sometimes black-red tracer instead of white.

PANEL ASSEMBLIES IN POWER UNITS

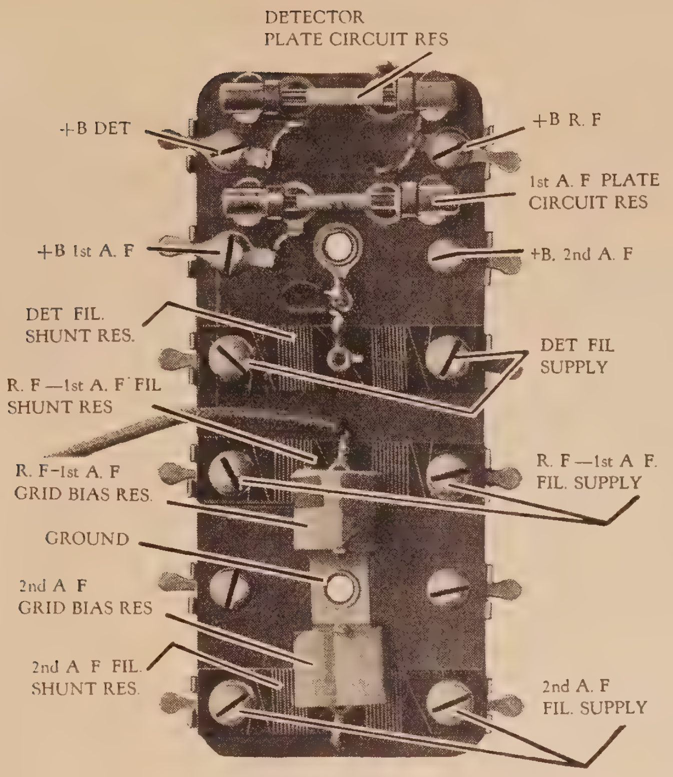

DETECTOR PLATE CIRCUIT RES
+B DET
+B R. F
1st A. F PLATE CIRCUIT RES
+B 1st A. F
+B. 2nd A. F
DET FIL. SHUNT RES.
DET FIL SUPPLY
R. F—1st A. F FIL SHUNT RES
R. F-1st A. F GRID BIAS RES.
R. F—1st A F. FIL. SUPPLY
GROUND
2nd A F GRID BIAS RES
2nd A F FIL. SHUNT RES.
2nd A. F FIL. SUPPLY

Fig. 82. Rear View of Panel Assembly on Model 37, 37-F, 37-C, 38 and Later Type "Y" Power Units.

The terminal on the right hand side of the ground eyelet is used as "speaker-return" terminal on later Model 37 and 38 sets. In Model 37 Console sets, and in later type "Y" power units, the terminals on either side of the ground eyelet are used for toggle switch connection in the 110-volt line.

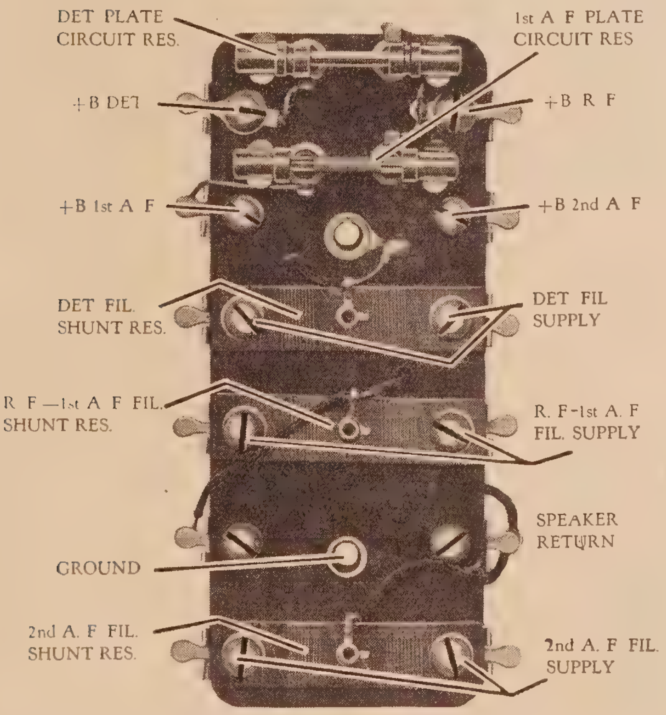

DET PLATE CIRCUIT RES.
1st A F PLATE CIRCUIT RES
+B DET
+B R F
+B 1st A F
+B 2nd A F
DET FIL. SHUNT RES.
DET FIL SUPPLY
R F—1st A F FIL. SHUNT RES.
R. F-1st A. F FIL. SUPPLY
SPEAKER RETURN
GROUND
2nd A. F FIL. SHUNT RES.
2nd A. F FIL. SUPPLY

Fig. 85. Bottom View of Panel Assembly Used in Power Unit of Model 40, 40-F, 42, 42-F, 43, 44, 44-F, 45, 46, 47, 52, 53, 56 and 57.

The terminal at the left of the ground eyelet (in this view) is used as a junction point for the lead from the centre-tap of the R. F. 1st-A. F. filament-shunt resistor, and the blue (red in some models) lead from the 1st-A. F. by-pass condenser. This terminal is not connected to the set.

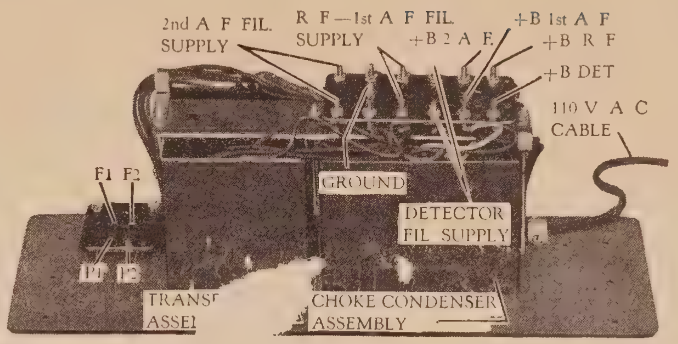

2nd A F FIL. SUPPLY
R F—1st A F FIL. SUPPLY
+B 2 A F
+B 1st A F
+B R F
+B DET
110 V A C CABLE
F1 F2
GROUND
DETECTOR FIL SUPPLY
P1 P2
TRANS ASSE
CHOKE CONDENSER ASSEMBLY

Fig. 83. Power Unit in Model 37, 37-F, 37-C and 38. Cover Removed.

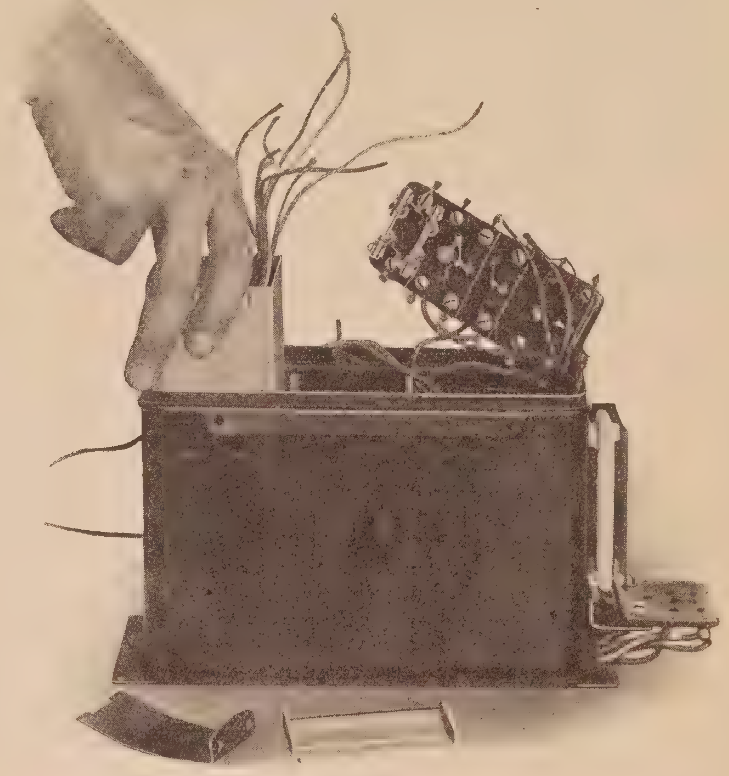


Fig. 84. Removing Condenser Section in Power Unit for Model 40-F, 42-F, 44-F and 2nd Type of Model 44.

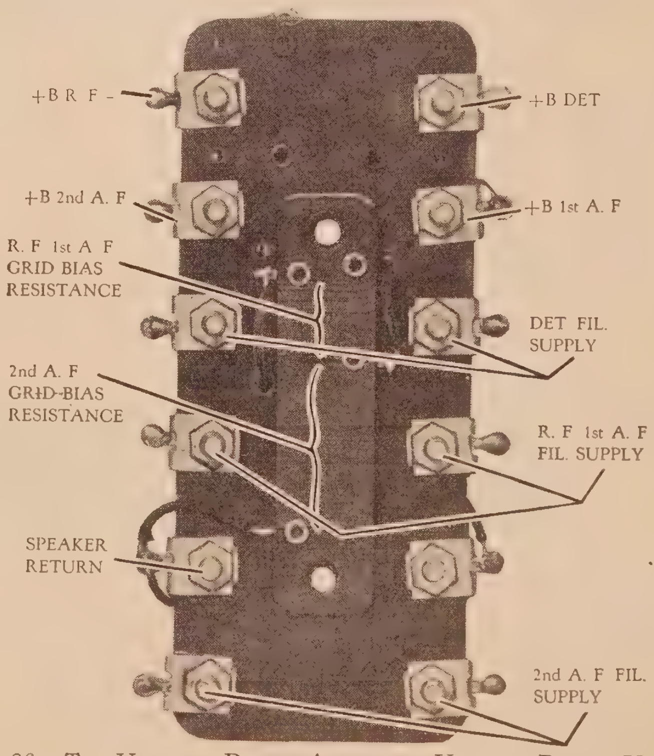

+B R F
+B DET
+B 2nd A. F
+B 1st A. F
R. F 1st A F GRID BIAS RESISTANCE
DET FIL. SUPPLY
2nd A. F GRID-BIAS RESISTANCE
R. F 1st A. F FIL. SUPPLY
SPEAKER RETURN
2nd A. F FIL. SUPPLY

Fig. 86. Top View of Panel Assembly Used in Power Unit of Model 40, 40-F, 42, 42-F, 43, 44, 44-F, 45, 46, 47, 52, 53, 56 and 57.

MODEL 40, 40-F, 42, 42-F, 44, 44-F, 45, 52, 56 AND 57 CHASSIS

For Description of Power Unit, see Page 60

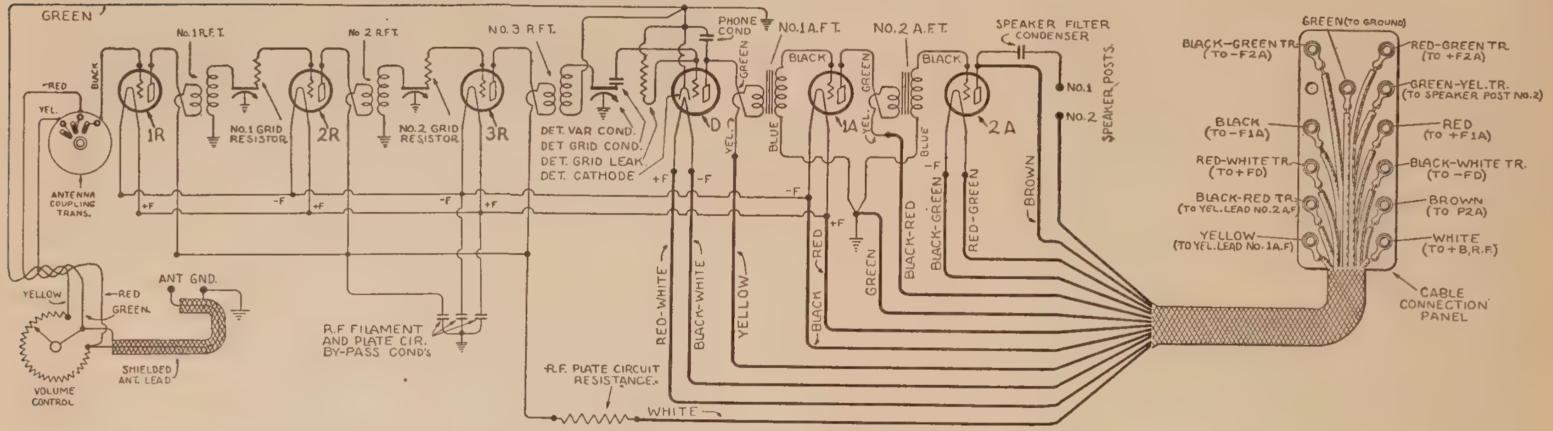

GREEN
No.1 R.F.T.
No 2 R.F.T.
NO.3 R.F.T.
PHONE COND
NO.1 A.F.T.
NO.2 A.F.T.
SPEAKER FILTER CONDENSER
BLACK
BLACK
GREEN
BLUE
YEL
NO.1
NO.2
SPEAKER POSTS
RED
YEL.
1R
2R
3R
D
1A
2A
NO.1 GRID RESISTOR
NO.2 GRID RESISTOR
DET. VAR COND.
DET GRID COND.
DET. GRID LEAK
DET. CATHODE
ANTENNA COUPLING TRANS.
+F
-F
YELLOW
RED
GREEN
ANT GND.
R.F. FILAMENT AND PLATE CIR. BY-PASS COND'S
SHIELDED ANT. LEAD
VOLUME CONTROL
R.F. PLATE CIRCUIT RESISTANCE
WHITE
RED-WHITE
BLACK-WHITE
YELLOW
BLACK
RED
GREEN
BLACK-RED
BLACK-GREEN
RED-GREEN
BROWN
GREEN (TO GROUND)
BLACK-GREEN TR. (TO -F2A)
RED-GREEN TR. (TO +F2A)
GREEN-YEL. TR. (TO SPEAKER POST NO.2)
BLACK (TO -F1A)
RED (TO +F1A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
BLACK-RED TR. (TO YEL. LEAD NO.2 A.F.)
BROWN (TO P2A)
YELLOW (TO YEL. LEAD NO. 1A.F.)
WHITE (TO +B,R.F.)
CABLE CONNECTION PANEL

Fig. 87. Wiring Diagram of Model 40, 40-F, 42, 42-F, 52, 56 and 57.

Model 52 does not have the shielded antenna lead, but is provided with two twenty-foot leads which are connected to the volume control, black for antenna and black-green tracer for ground. Model 56 and 57 have antenna and ground posts at the bottom of the cabinet.

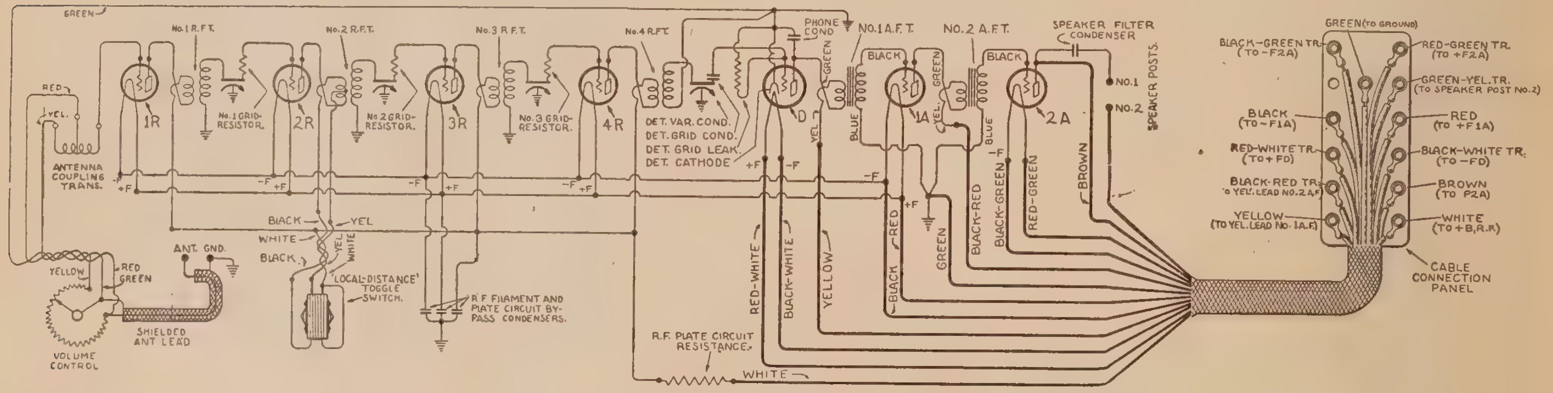

GREEN
No.1 R.F.T.
No.2 R.F.T.
No.3 R.F.T.
No.4 R.F.T.
PHONE COND
NO.1 A.F.T.
NO.2 A.F.T.
SPEAKER FILTER CONDENSER
BLACK
BLACK
GREEN
BLUE
YEL
NO.1
NO.2
SPEAKER POSTS
RED
YEL.
1R
2R
3R
4R
D
1A
2A
No.1 GRID-RESISTOR
No.2 GRID-RESISTOR
No.3 GRID-RESISTOR
DET. VAR. COND.
DET. GRID COND.
DET. GRID LEAK
DET. CATHODE
ANTENNA COUPLING TRANS.
+F
-F
BLACK
YEL
WHITE
BLACK
LOCAL-DISTANCE TOGGLE SWITCH
YELLOW
RED
GREEN
ANT. GND.
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
SHIELDED ANT. LEAD
VOLUME CONTROL
R.F. PLATE CIRCUIT RESISTANCE
WHITE
RED-WHITE
BLACK-WHITE
YELLOW
BLACK
RED
GREEN
BLACK-RED
BLACK-GREEN
RED-GREEN
BROWN
GREEN (TO GROUND)
BLACK-GREEN TR. (TO -F2A)
RED-GREEN TR. (TO +F2A)
GREEN-YEL. TR. (TO SPEAKER POST NO.2)
BLACK (TO -F1A)
RED (TO +F1A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
BLACK-RED TR. (TO YEL. LEAD NO.2 A.F.)
BROWN (TO P2A)
YELLOW (TO YEL. LEAD No. 1A.F.)
WHITE (TO +B,R.F.)
CABLE CONNECTION PANEL

Fig. 88. Wiring Diagram of Model 44, 44-F and 45.

A schematic diagram of the volume control is shown in Fig. 93. The ground connection to the R. F. by-pass condensers, in this and other models, is made through the metal container in which the condensers are sealed. A pictorial representation of the antenna coupling transformer is shown in Fig. 87.

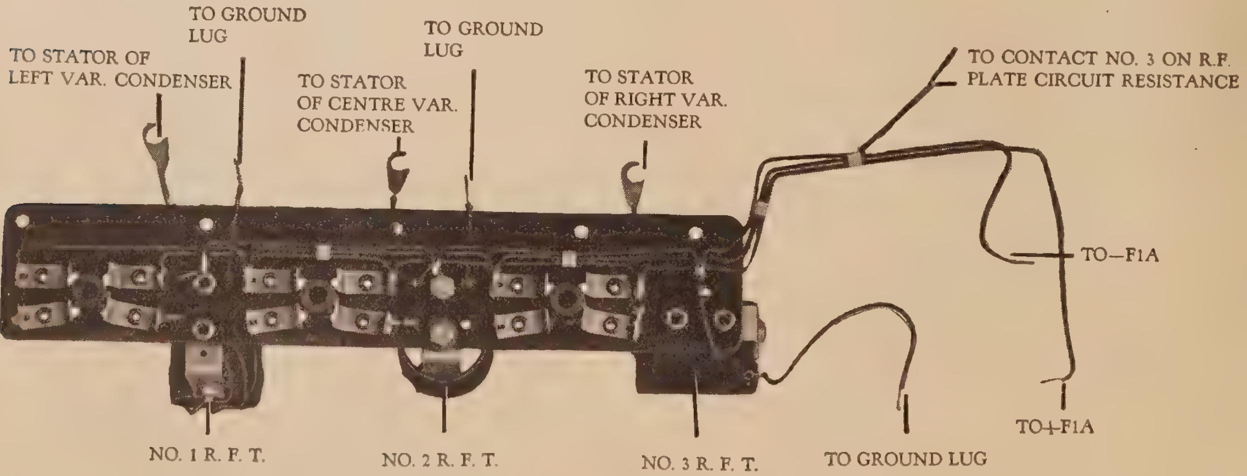

TO GROUND LUG
TO STATOR OF LEFT VAR. CONDENSER
TO GROUND LUG
TO STATOR OF CENTRE VAR. CONDENSER
TO STATOR OF RIGHT VAR. CONDENSER
TO CONTACT NO. 3 ON R.F. PLATE CIRCUIT RESISTANCE
TO—F1A
TO+F1A
NO. 1 R. F. T.
NO. 2 R. F. T.
NO. 3 R. F. T.
TO GROUND LUG

Fig. 89. View of R. F. Amplifier Assembly in Model 40, 40-F, 42, 42-F, 52, 56 and 57.

MODEL 40, 40-F, 42, 42-F, 44, 44-F, 45, 52, 56 AND 57 CHASSIS

For Description of Power Unit, see Page 60

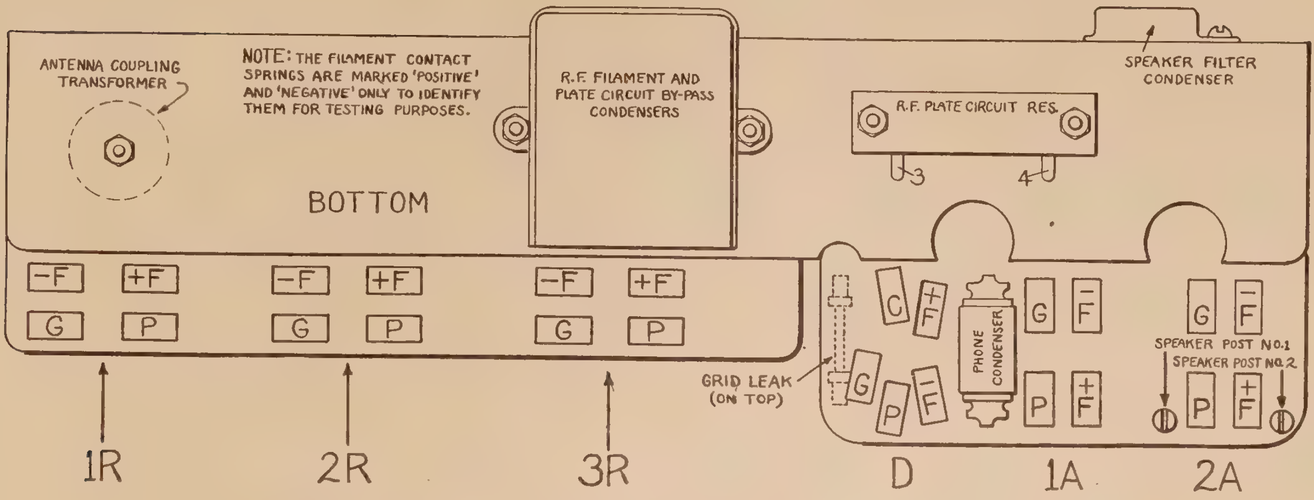

ANTENNA COUPLING TRANSFORMER
NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED 'POSITIVE' AND 'NEGATIVE' ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
SPEAKER FILTER CONDENSER
R.F. PLATE CIRCUIT RES.
3
4
BOTTOM
−F
+F
G
P
C
PHONE CONDENSER
GRID LEAK (ON TOP)
SPEAKER POST NO.1
SPEAKER POST NO.2
1R
2R
3R
D
1A
2A

FIG. 90. CHART FOR MODEL 40, 40-F, 42, 42-F, 52, 56 AND 57.

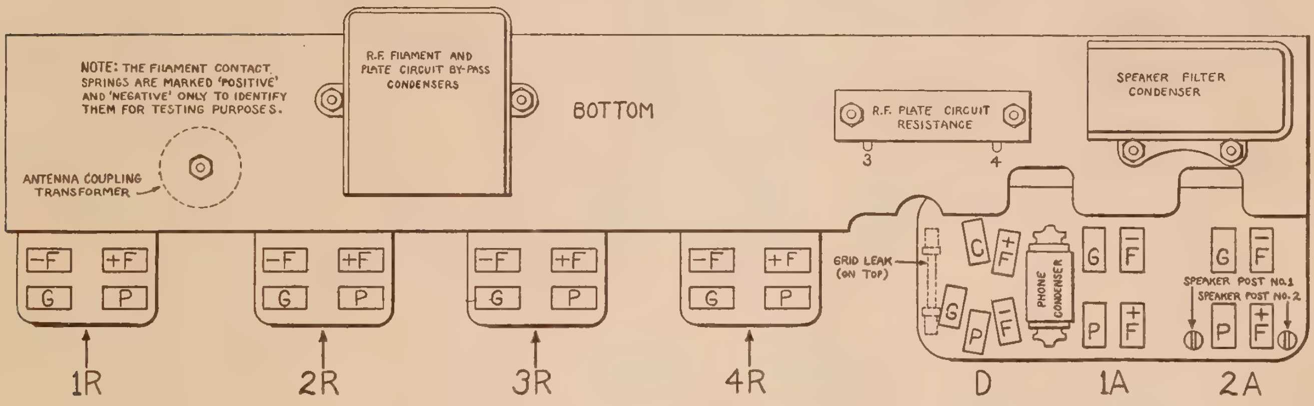
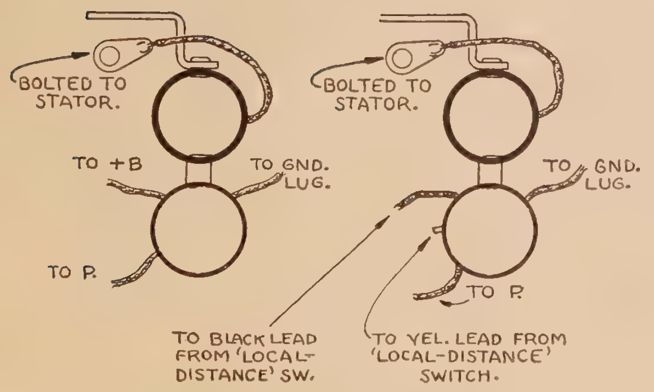

NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED 'POSITIVE' AND 'NEGATIVE' ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
ANTENNA COUPLING TRANSFORMER
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
BOTTOM
R.F. PLATE CIRCUIT RESISTANCE
3
4
SPEAKER FILTER CONDENSER
−F
+F
G
P
C
GRID LEAK (ON TOP)
PHONE CONDENSER
SPEAKER POST NO.1
SPEAKER POST NO.2
1R
2R
3R
4R
D
1A
2A

FIG. 91. CHART FOR MODEL 44, 44-F AND 45.


BOLTED TO STATOR.
TO +B
TO GND. LUG.
TO P.
BOLTED TO STATOR.
TO GND. LUG.
TO P.
TO BLACK LEAD FROM 'LOCAL-DISTANCE' SW.
TO YEL. LEAD FROM 'LOCAL-DISTANCE' SWITCH.

NO. 1, 3, 4 R.F.T. NO. 2 R.F.T.

FIG. 92. SKETCH SHOWING CONNECTIONS FROM R. F. TRANSFORMERS IN MODEL 44, 44-F, 45 AND 47.

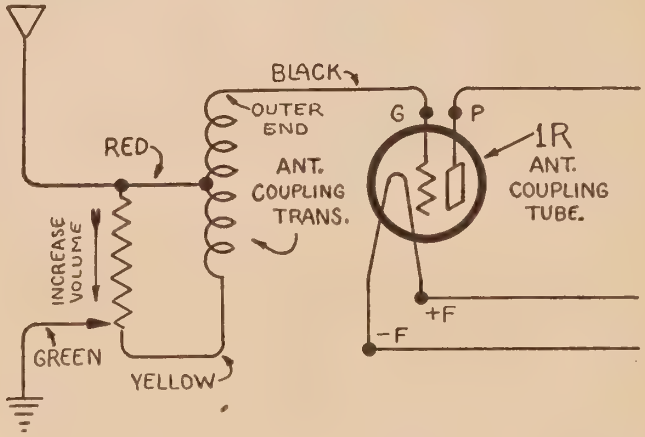

BLACK
OUTER END
RED
ANT. COUPLING TRANS.
G
P
1R
ANT. COUPLING TUBE.
INCREASE VOLUME
GREEN
YELLOW
+F
−F

FIG. 93. SCHEMATIC DIAGRAM OF VOLUME CONTROL, MODEL 40, 40-F, 42, 42-F, 43, 44, 44-F, 45, 46, 47, 52, 53, 56 AND 57.

POWER UNIT IN MODEL 40, 42, 44, 45, 52, 56 AND 57

For Additional Information, see Pages 57, 61 and 62

Model 40-F, 42-F and 44-F Power Units are described on Page 62.

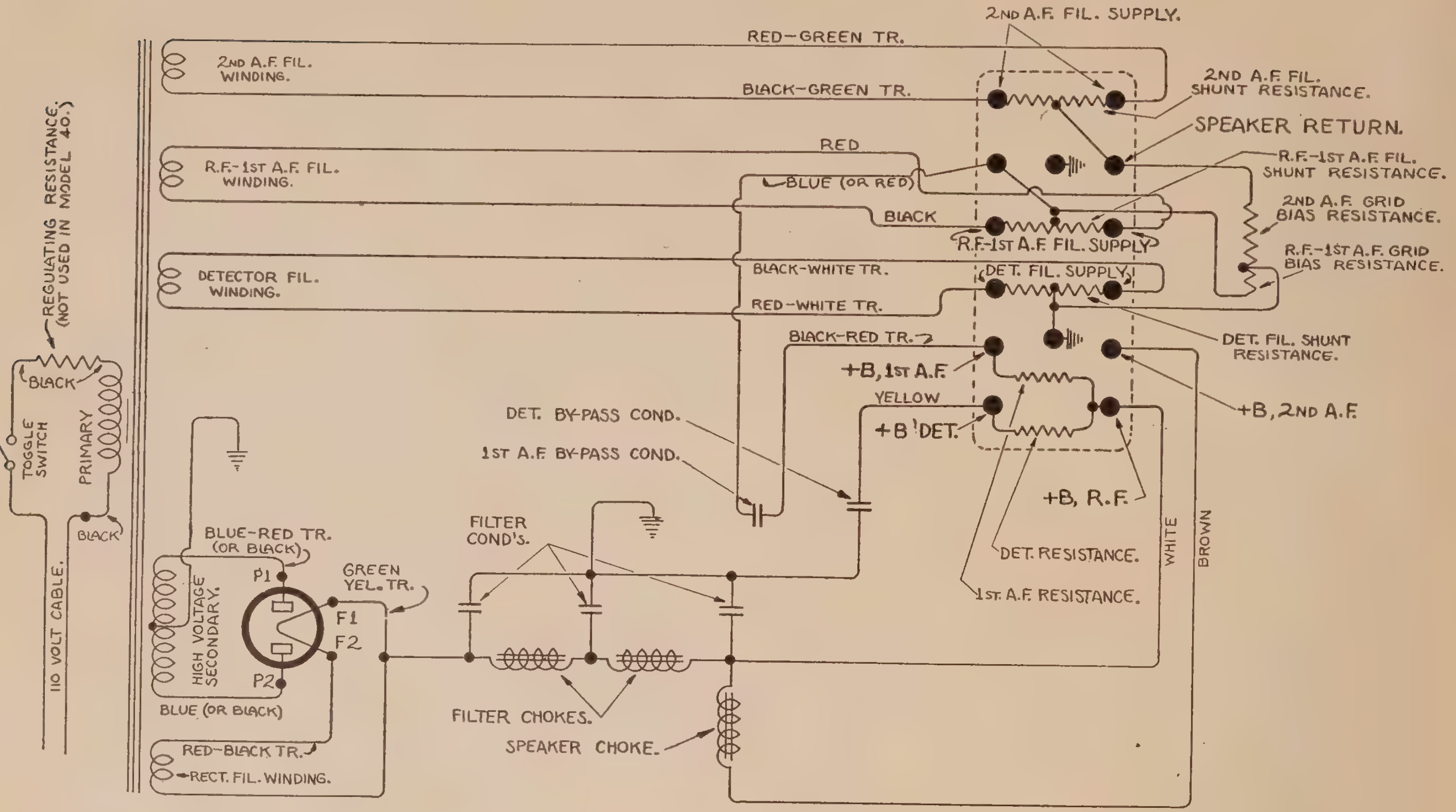

2ND A.F. FIL. SUPPLY.
RED–GREEN TR.
2ND A.F. FIL. WINDING.
BLACK–GREEN TR.
2ND A.F. FIL. SHUNT RESISTANCE.
SPEAKER RETURN.
RED
R.F.–1ST A.F. FIL. WINDING.
BLUE (OR RED)
R.F.–1ST A.F. FIL. SHUNT RESISTANCE.
BLACK
2ND A.F. GRID BIAS RESISTANCE.
R.F.–1ST A.F. FIL. SUPPLY
R.F.–1ST A.F. GRID BIAS RESISTANCE.
DETECTOR FIL. WINDING.
BLACK-WHITE TR.
DET. FIL. SUPPLY.
RED-WHITE TR.
REGULATING RESISTANCE. (NOT USED IN MODEL 40.)
BLACK–RED TR.
DET. FIL. SHUNT RESISTANCE.
+B, 1ST A.F.
BLACK
YELLOW
+B, 2ND A.F.
TOGGLE SWITCH
PRIMARY
DET. BY-PASS COND.
+B DET.
1ST A.F. BY-PASS COND.
+B, R.F.
BLACK
BLUE-RED TR. (OR BLACK)
FILTER COND'S.
110 VOLT CABLE.
GREEN YEL. TR.
P1
F1
F2
HIGH VOLTAGE SECONDARY.
P2
DET. RESISTANCE.
WHITE
BROWN
1ST A.F. RESISTANCE.
BLUE (OR BLACK)
FILTER CHOKES.
RED–BLACK TR.
SPEAKER CHOKE.
RECT. FIL. WINDING.

Fig. 94. Schematic Diagram of Power Unit in Model 40, 42, 44, 45, 52, 56 and 57.
The regulating resistor is used only in Model 42, 44 and 52.

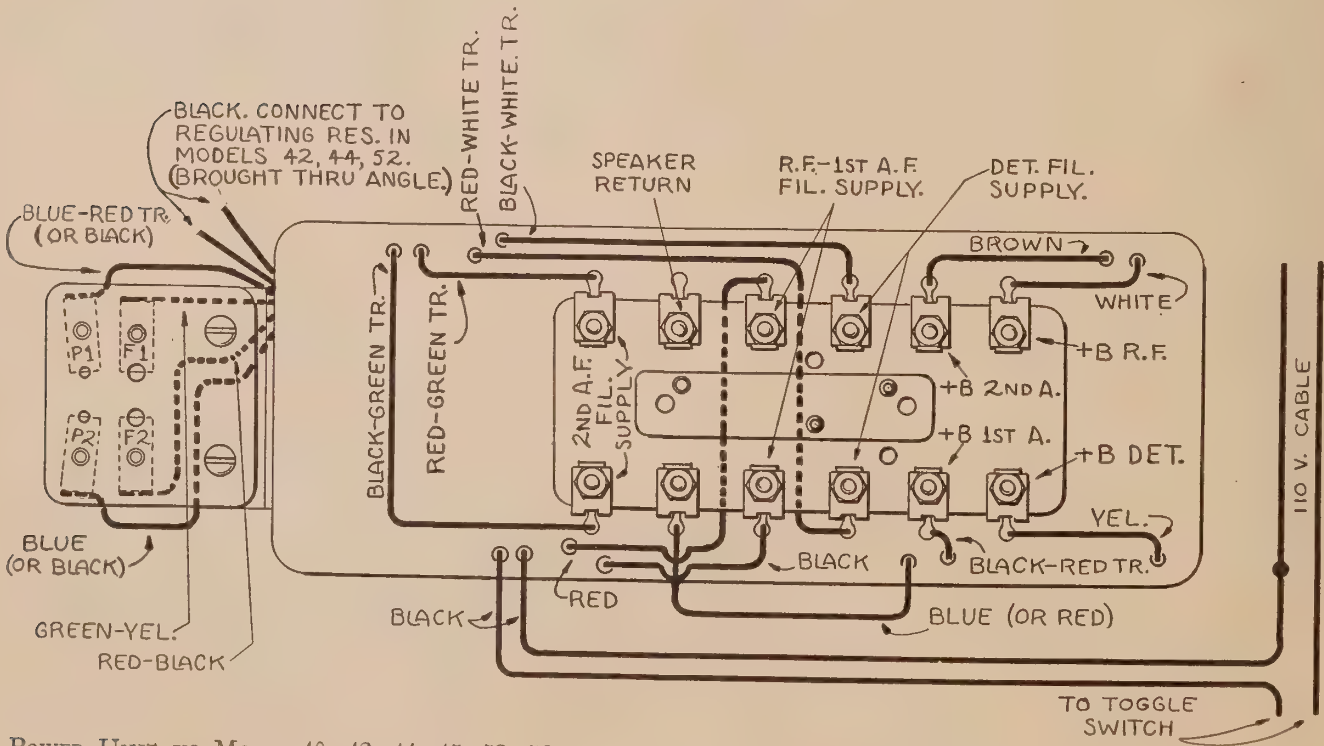

BLACK. CONNECT TO REGULATING RES. IN MODELS 42, 44, 52. (BROUGHT THRU ANGLE.)
RED-WHITE TR.
BLACK-WHITE TR.
SPEAKER RETURN
R.F.–1ST A.F. FIL. SUPPLY.
DET. FIL. SUPPLY.
BLUE-RED TR. (OR BLACK)
BROWN
WHITE
P1
F1
P2
F2
BLACK-GREEN TR.
RED-GREEN TR.
2ND A.F. FIL. SUPPLY
+B R.F.
+B 2ND A.
+B 1ST A.
+B DET.
110 V. CABLE
YEL.
BLUE (OR BLACK)
BLACK
BLACK-RED TR.
RED
BLACK
BLUE (OR RED)
GREEN-YEL.
RED-BLACK
TO TOGGLE SWITCH

Fig. 95. Power Unit in Model 40, 42, 44, 45, 52, 56 and 57, Showing Connections From Sealed Container to Panel Assembly, Rectifier Socket and Regulating Resistance.

This view shows the approximate position of leads from sealed container. In Model 42, 44 and 52, a hole is cut in the rectifier-socket mounting angle and the two black leads are brought up through the hole and connect to the regulating resistor, which is mounted upright at the left-hand end of the sealed container.

2ND TYPE OF POWER UNIT IN MODEL 40, 56 AND 57

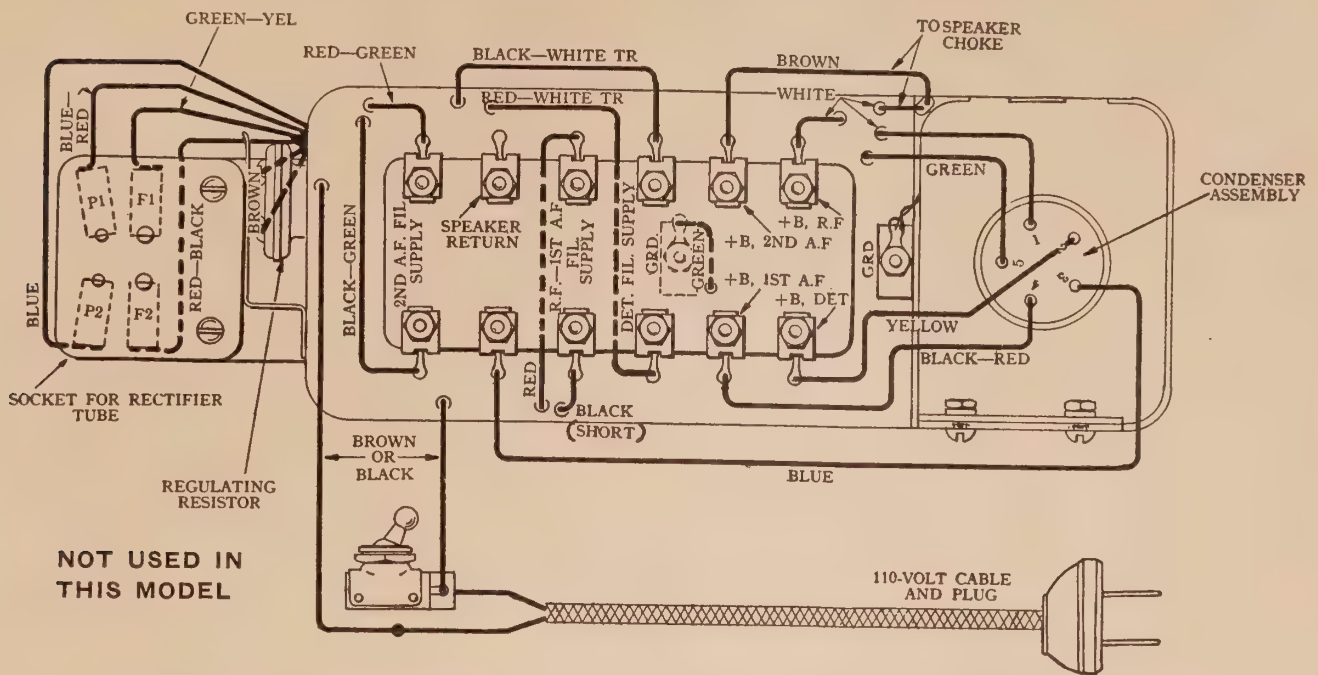

GREEN—YEL
RED—GREEN
BLACK—WHITE TR
RED—WHITE TR
BROWN
WHITE
TO SPEAKER CHOKE
BLUE—RED
BLUE
P1
F1
P2
F2
RED—BLACK
BROWN
BLACK—GREEN
2ND A.F. FIL SUPPLY
SPEAKER RETURN
R.F.—1ST A.F. FIL SUPPLY
DET. FIL. SUPPLY
GRD.
C
GREEN
+B, R.F
+B, 2ND A.F
+B, 1ST A.F
+B, DET
GRD
GREEN
CONDENSER ASSEMBLY
YELLOW
BLACK—RED
RED
BLACK (SHORT)
SOCKET FOR RECTIFIER TUBE
BROWN OR BLACK
REGULATING RESISTOR
BLUE
NOT USED IN THIS MODEL
110-VOLT CABLE AND PLUG

FIG. 96. VIEW SHOWING CONNECTIONS IN 2ND TYPE OF POWER UNIT FOR MODEL 40, 56 AND 57.
This view shows the panel assembly moved to left of normal position. The layout of the panel assembly is the same as shown in the illustrations on Page 57.

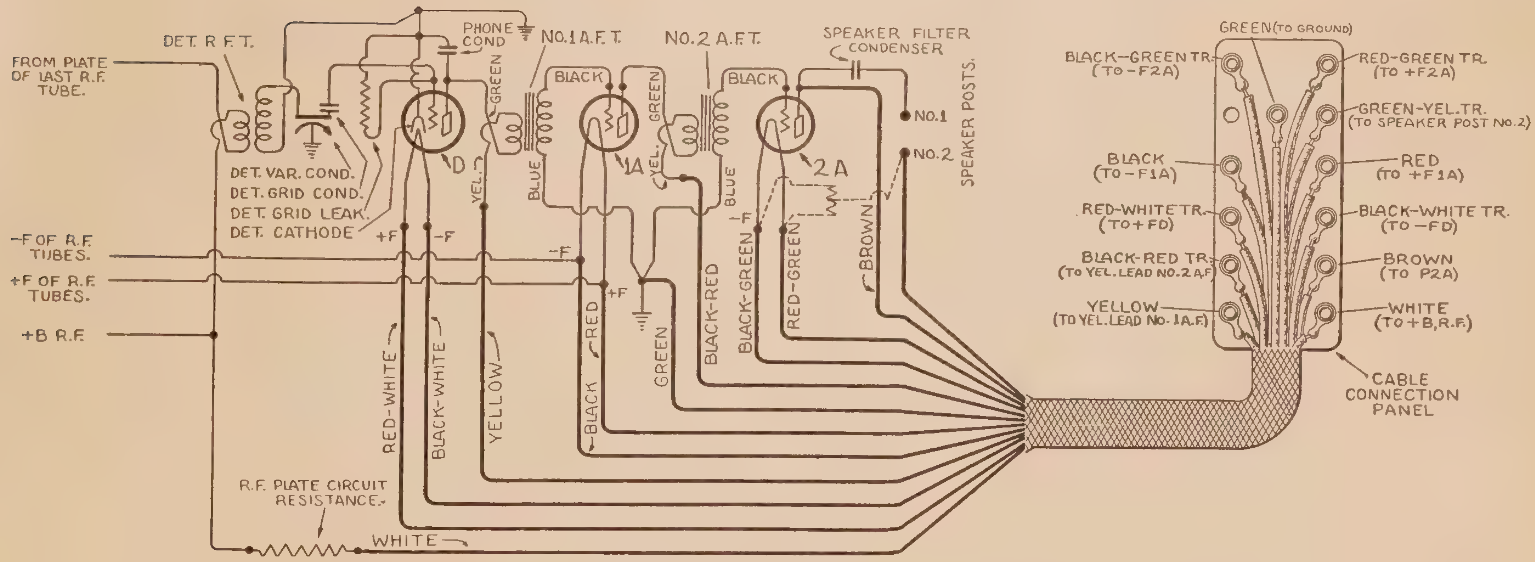

FROM PLATE OF LAST R.F. TUBE.
DET. R.F.T.
PHONE COND
NO.1 A.F.T.
NO.2 A.F.T.
SPEAKER FILTER CONDENSER
BLACK
GREEN
BLACK
GREEN
NO.1
NO.2
SPEAKER POSTS.
D
1A
2A
DET. VAR. COND.
DET. GRID COND.
DET. GRID LEAK.
DET. CATHODE
+F
-F
YEL.
BLUE
YEL.
BLUE
-F
-F OF R.F. TUBES.
+F OF R.F. TUBES.
+B R.F.
-F
+F
RED-WHITE
BLACK-WHITE
YELLOW
BLACK
RED
GREEN
BLACK-RED
BLACK-GREEN
RED-GREEN
BROWN
R.F. PLATE CIRCUIT RESISTANCE.
WHITE
GREEN (TO GROUND)
BLACK—GREEN TR. (TO -F2A)
RED-GREEN TR. (TO +F2A)
GREEN-YEL. TR. (TO SPEAKER POST NO.2)
BLACK (TO -F1A)
RED (TO +F1A)
RED-WHITE TR. (TO +FD)
BLACK-WHITE TR. (TO -FD)
BLACK-RED TR. (TO YEL. LEAD NO.2 A.F.)
BROWN (TO P2A)
YELLOW (TO YEL. LEAD NO. 1A.F.)
WHITE (TO +B, R.F.)
CABLE CONNECTION PANEL

FIG. 97. DETECTOR AND TWO STAGE AUDIO FREQUENCY AMPLIFYING CIRCUIT USED IN LATER MODEL 36, AND IN MODEL 37, 37-F, 37-C, 38, 40, 40-F, 42, 42-F, 44, 44-F, 45, 52, 56 AND 57.

The 2nd-A. F. filament-shunt resistor (shown in dotted lines) is used in all Model 36 sets and in many Model 37 and 38. In later Model 37 and 38, and in Model 40, 42, 44, 45, 52, 56 and 57, this resistor is not used in set, but the 2nd-A. F. filament-shunt resistor in power unit is used for the same purpose, a green-yellow tracer lead connecting speaker post No. 2 to the centre tap of the 2nd-A. F. filament-shunt resistor in the power unit. In Model 36, and in Model 37 console sets, the two terminals on either side of the ground eyelet are used for toggle switch connection in the 110-volt line. In some Model 36 sets a green-yellow tracer lead is used instead of a black-red tracer lead for connection to the yellow lead of the 2nd-A. F. T. The R. F. plate-circuit resistor is not used in Model 36 nor in some 37 and 38 sets. Except for these minor variations, this circuit is standard in these sets, and the service man should remember the color scheme of A. F. transformers and the colors of cable leads and their location on the connection panel.

POWER UNIT IN MODEL 40-F, 42-F, 44-F AND 2ND TYPE OF MODEL 44

See Fig. 84 on Page 57.

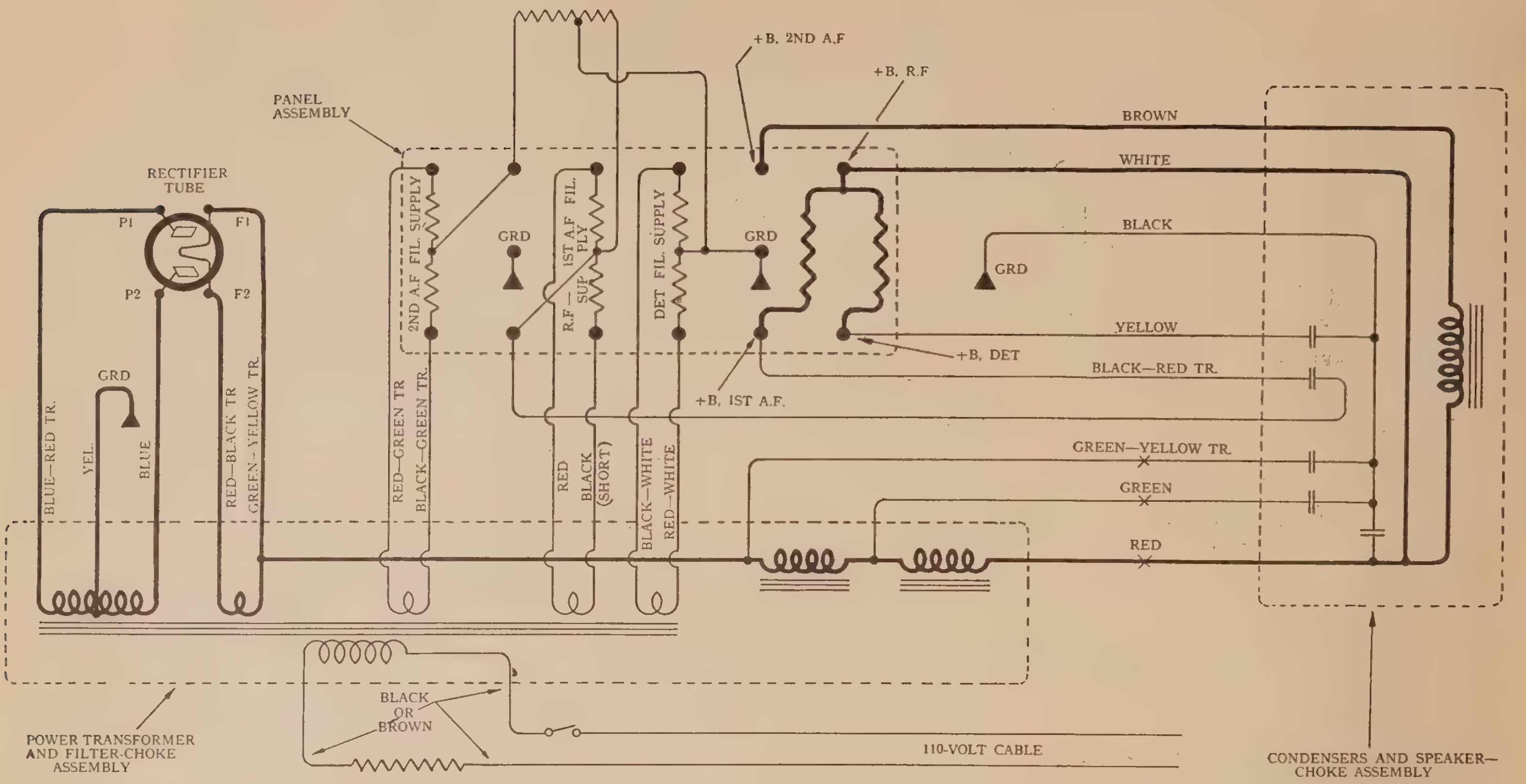

+B, 2ND A.F
+B, R.F
PANEL ASSEMBLY
BROWN
WHITE
BLACK
RECTIFIER TUBE
P1
F1
P2
F2
GRD
GRD
GRD
GRD
2ND A.F FIL. SUPPLY
1ST A.F FIL. SUPPLY
R.F — SUP
DET FIL. SUPPLY
YELLOW
+B, DET
BLACK—RED TR.
+B, 1ST A.F.
GREEN—YELLOW TR.
GREEN
RED
BLUE—RED TR.
YEL.
BLUE
RED—BLACK TR
GREEN—YELLOW TR.
RED—GREEN TR
BLACK—GREEN TR.
RED
BLACK (SHORT)
BLACK—WHITE
RED—WHITE
BLACK OR BROWN
110-VOLT CABLE
POWER TRANSFORMER AND FILTER-CHOKE ASSEMBLY
CONDENSERS AND SPEAKER—CHOKE ASSEMBLY

FIG. 98. WIRING DIAGRAM OF POWER UNIT FOR MODEL 40-F, 42-F, 44-F AND 2ND TYPE OF UNIT FOR MODEL 44.

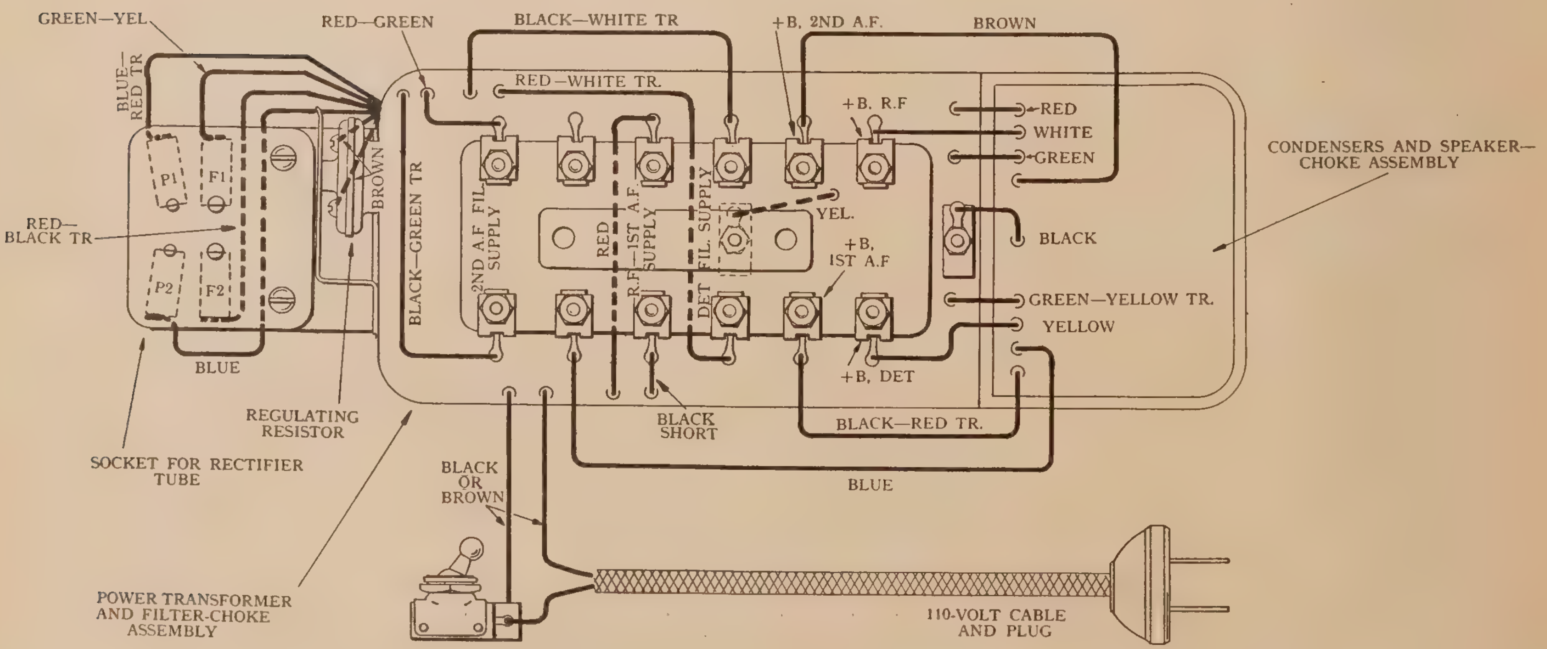

GREEN—YEL.
RED—GREEN
BLACK—WHITE TR
+B, 2ND A.F.
BROWN
BLUE—RED TR
RED—WHITE TR.
+B, R.F
RED
WHITE
GREEN
CONDENSERS AND SPEAKER—CHOKE ASSEMBLY
P1
F1
BROWN
BLACK—GREEN TR
2ND A.F FIL. SUPPLY
RED
R.F—1ST A.F. SUPPLY
DET FIL. SUPPLY
YEL.
+B, 1ST A.F
BLACK
RED—BLACK TR
P2
F2
GREEN—YELLOW TR.
YELLOW
+B, DET
BLUE
BLACK SHORT
BLACK—RED TR.
REGULATING RESISTOR
SOCKET FOR RECTIFIER TUBE
BLACK OR BROWN
BLUE
POWER TRANSFORMER AND FILTER-CHOKE ASSEMBLY
110-VOLT CABLE AND PLUG

FIG. 99. SHOWING CONNECTIONS AND APPROXIMATE POSITION OF LEADS FROM SEALED CONTAINER POWER UNIT FOR MODEL 40-F, 42-F, 44-F AND 2ND TYPE OF MODEL 44.
This view shows panel assembly moved to left of normal position.

B POWER UNIT, TYPE R, No. 8800

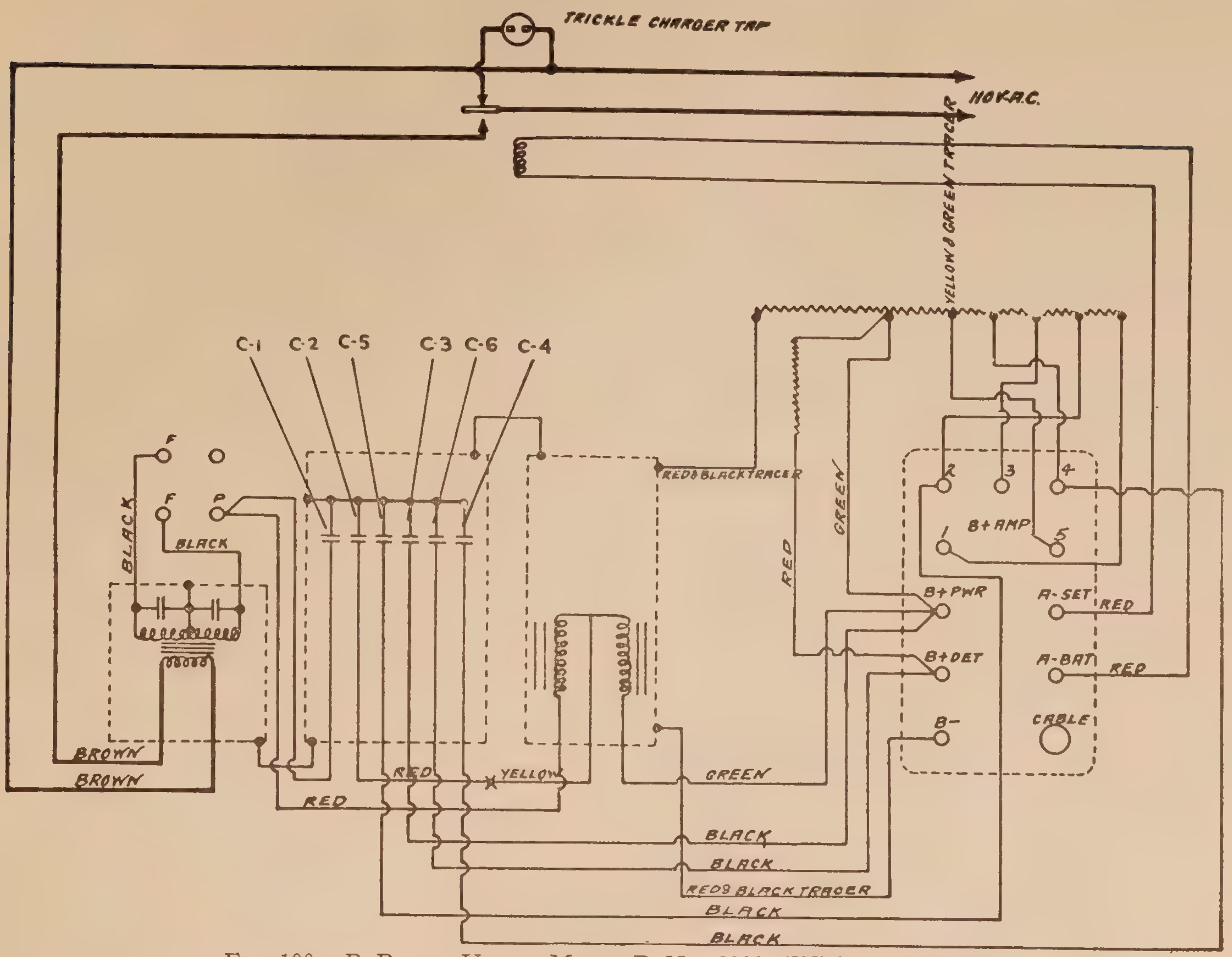

TRICKLE CHARGER TAP
110V A.C.
YELLOW & GREEN TRACER
C-1
C-2
C-5
C-3
C-6
C-4
F
F
P
BLACK
BLACK
RED & BLACK TRACER
GREEN
RED
2
3
4
1
B+AMP
5
B+PWR
B+DET
B−
A-SET
RED
A-BAT
RED
CABLE
BROWN
BROWN
RED
RED
YELLOW
GREEN
BLACK
BLACK
RED & BLACK TRACER
BLACK
BLACK

Fig. 100. B Power Unit. Model R No. 8800 (Wiring Diagram).

Note.—In Model "S" Unit for 25-cycle A. C. Power, Condenser C-5 is connected to Post 3 of "B + AMP," and Condenser C-4 is omitted.

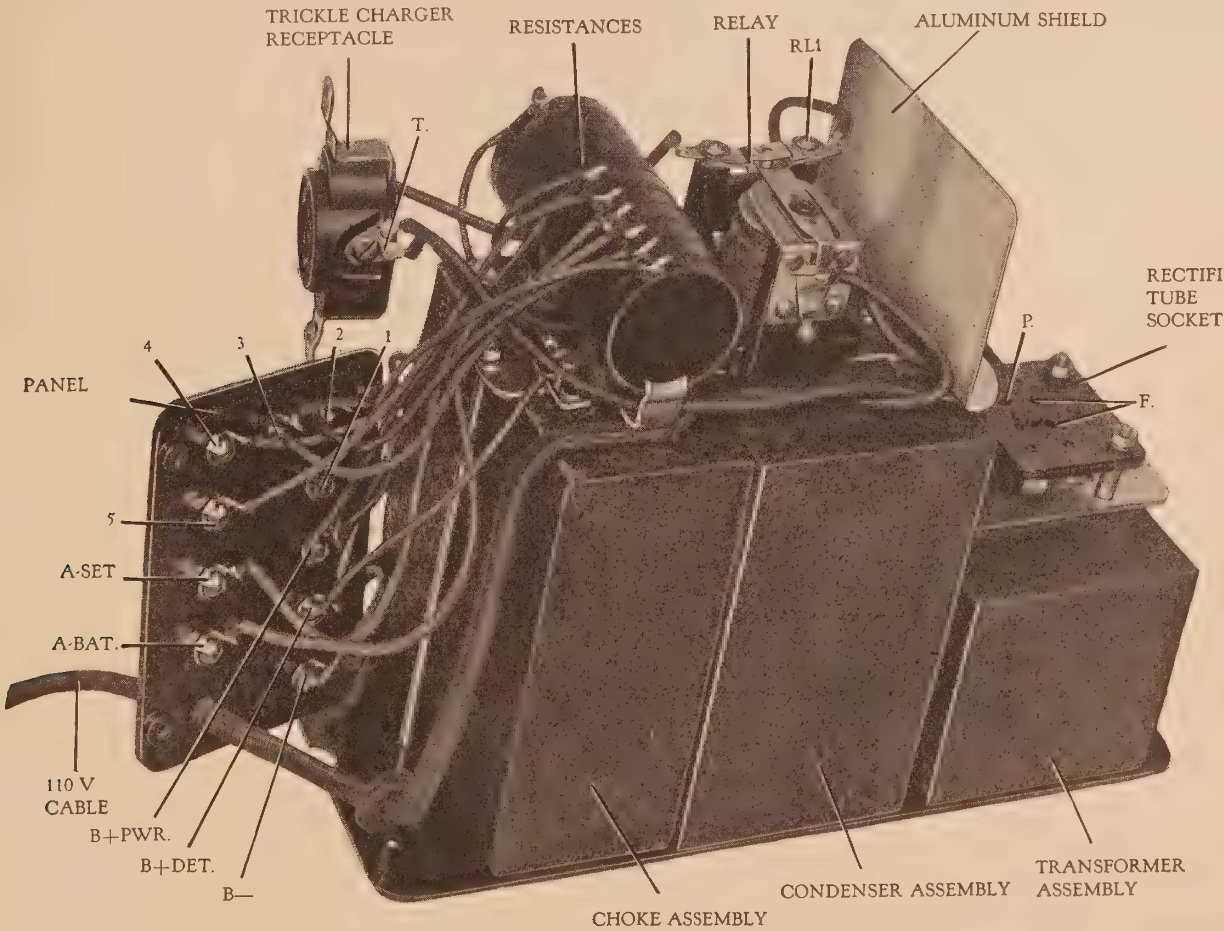

TRICKLE CHARGER RECEPTACLE
T.
RESISTANCES
RELAY
RL1
ALUMINUM SHIELD
RECTIFIER TUBE SOCKET
P.
F.
PANEL
4
3
2
1
5
A-SET
A-BAT.
110 V CABLE
B+PWR.
B+DET.
B—
CHOKE ASSEMBLY
CONDENSER ASSEMBLY
TRANSFORMER ASSEMBLY

Fig. 101. View of B Power Unit.
Use Raytheon type BH rectifier tube for replacement.

MODEL 41 CHASSIS

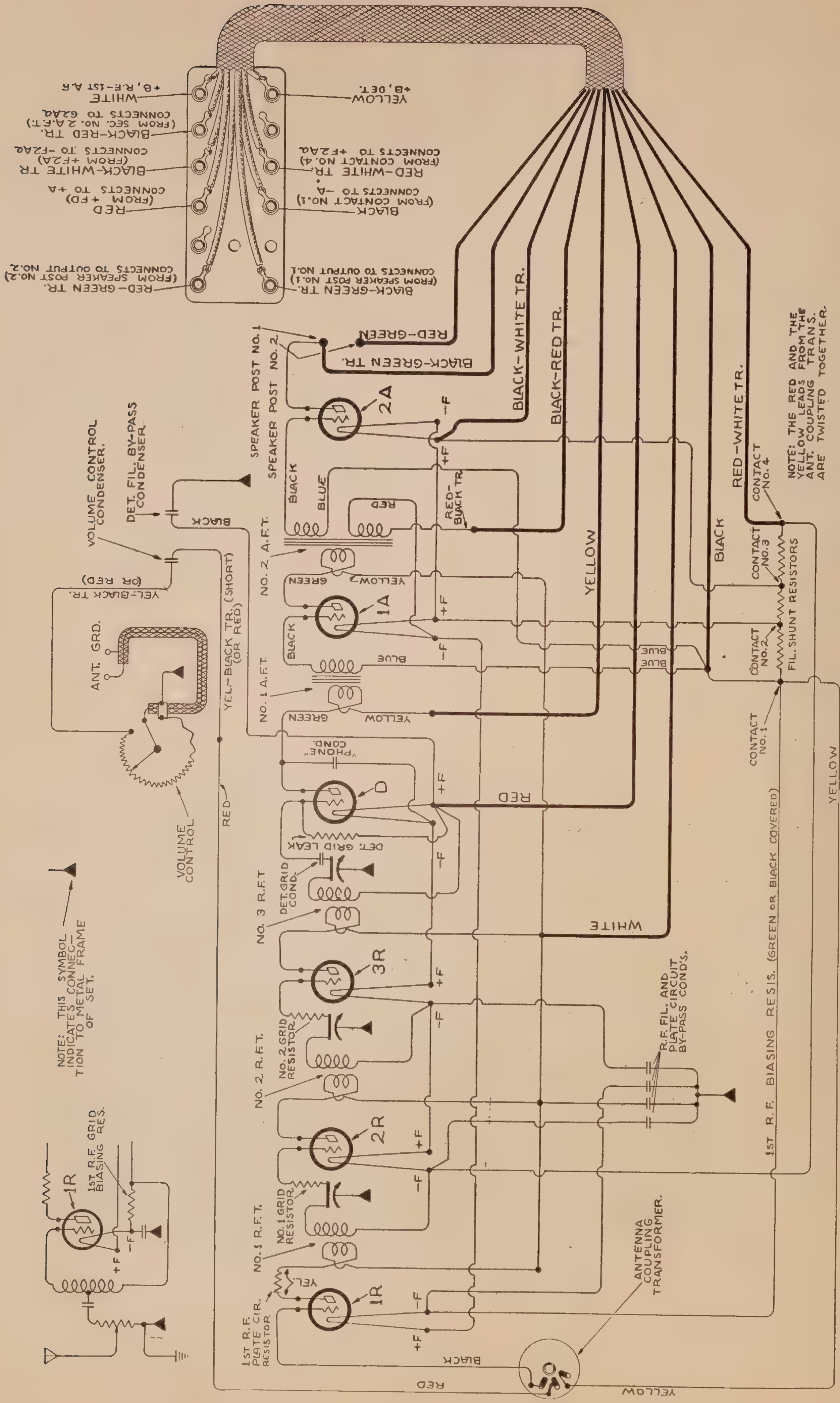

+B, R.F.-1ST A.F.
WHITE
CONNECTS TO 62A2
(FROM SEC. NO. 2 A.F.T.)
BLACK-RED TR.
CONNECTS TO -F2A2
(FROM +F2A)
BLACK-WHITE TR.
CONNECTS TO +A
(FROM +FD)
RED
CONNECTS TO OUTPUT NO.2
(FROM SPEAKER POST NO.2)
RED-GREEN TR.
+B, DET.
YELLOW
CONNECTS TO +F2A2
(FROM CONTACT NO.4)
RED-WHITE TR.
CONNECTS TO -A
(FROM CONTACT NO.1)
BLACK
CONNECTS TO OUTPUT NO.1
(FROM SPEAKER POST NO.1)
BLACK-GREEN TR.
RED-GREEN
BLACK-GREEN TR.
BLACK-WHITE TR.
BLACK-RED TR.
RED-WHITE TR.
NOTE: THE RED AND THE YELLOW LEADS FROM THE ANT. COUPLING TRANS. ARE TWISTED TOGETHER.
SPEAKER POST NO.1
SPEAKER POST NO.2
2A
-F
+F
BLACK
BLUE
RED
RED-BLACK TR.
CONTACT No.4
CONTACT No.3
CONTACT No.2
CONTACT No.1
FIL. SHUNT RESISTORS
YELLOW
BLACK
NO. 2 A.F.T.
GREEN
1A
NO. 1 A.F.T.
DET. FIL. BY-PASS CONDENSER.
VOLUME CONTROL CONDENSER.
YEL-BLACK TR. (OR RED)
YEL-BLACK TR. (SHORT) (OR RED)
ANT. GRD.
VOLUME CONTROL
RED
"PHONE" COND.
D
DET. GRID LEAK
DET. GRID COND.
NO. 3 R.F.T.
WHITE
3R
NO. 2 GRID RESISTOR
NO. 2 R.F.T.
R.F. FIL. AND PLATE CIRCUIT BY-PASS COND'S.
1ST R.F. BIASING RESIS. (GREEN OR BLACK COVERED)
2R
NO. 1 GRID RESISTOR
NO.1 R.F.T.
YEL.
1R
1ST R.F. PLATE CIR. RESISTOR
ANTENNA COUPLING TRANSFORMER.
BLACK
RED
YELLOW
NOTE: THIS SYMBOL INDICATES CONNECTION TO METAL FRAME OF SET.
1R
1ST R.F. GRID BIASING RES.

Fig. 102. Diagram of Model 41 Chassis.

MODEL 41 CHASSIS

For Voltage Table, See Page 106

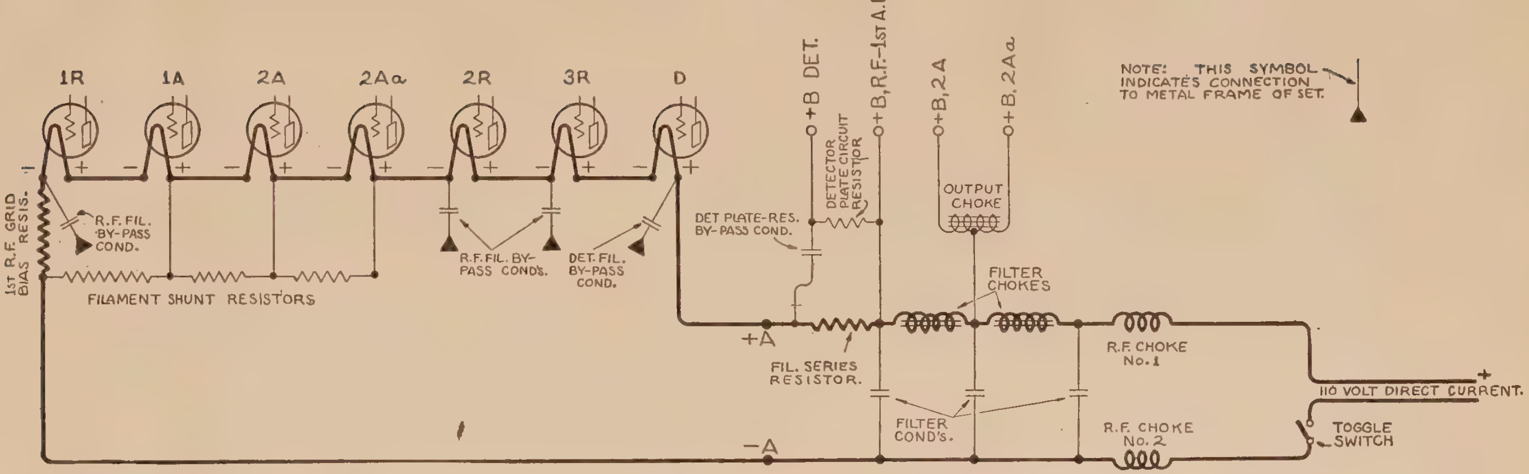

1R
1A
2A
2Aa
2R
3R
D
+B DET.
+B, R.F.-1st A.F
+B, 2A
+B, 2Aa
NOTE: THIS SYMBOL INDICATES CONNECTION TO METAL FRAME OF SET.
1st R.F. GRID BIAS RESIS.
R.F. FIL. BY-PASS COND.
FILAMENT SHUNT RESISTORS
R.F. FIL. BY-PASS CONDS.
DET. FIL. BY-PASS COND.
DET PLATE-RES. BY-PASS COND.
DETECTOR PLATE CIRCUIT RESISTOR
OUTPUT CHOKE
FILTER CHOKES
+A
FIL. SERIES RESISTOR.
R.F. CHOKE No. 1
110 VOLT DIRECT CURRENT.
FILTER COND'S.
R.F. CHOKE No. 2
TOGGLE SWITCH
−A

Fig. 103. Simplified Diagram of Power Unit and Filament Circuit in Model 41 Receiver.
Tubes of the 112-A type are used in all sockets except 2A and 2Aa, which are the '71-A type.

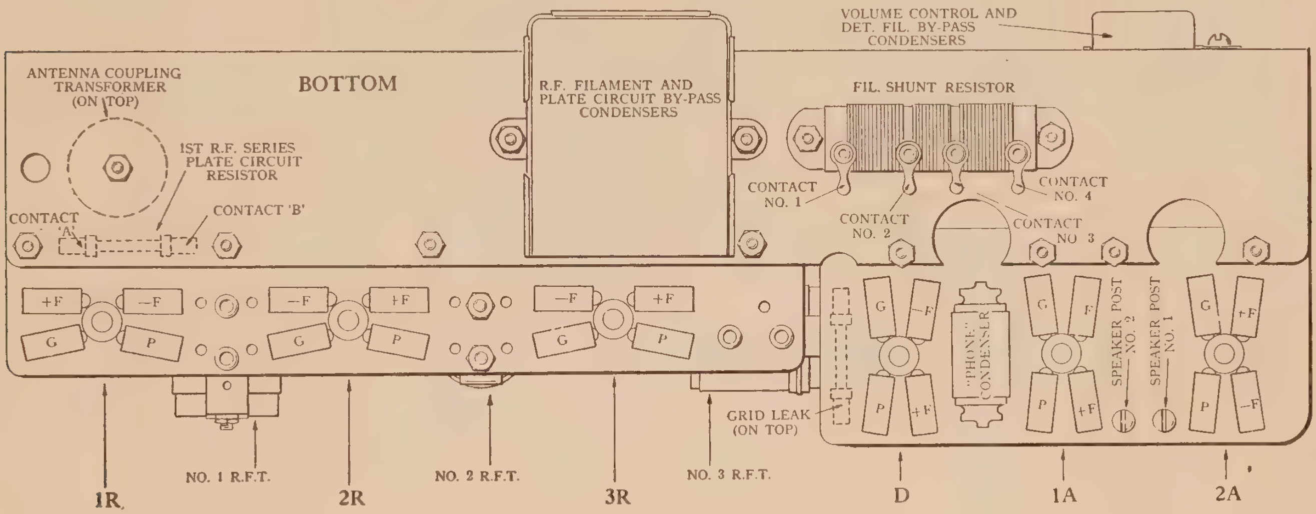

VOLUME CONTROL AND DET. FIL. BY-PASS CONDENSERS
ANTENNA COUPLING TRANSFORMER (ON TOP)
BOTTOM
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS
FIL. SHUNT RESISTOR
1ST R.F. SERIES PLATE CIRCUIT RESISTOR
CONTACT 'A'
CONTACT 'B'
CONTACT NO. 1
CONTACT NO. 2
CONTACT NO. 3
CONTACT NO. 4
+F
−F
G
P
"PHONE" CONDENSER
SPEAKER POST NO. 2
SPEAKER POST NO. 1
GRID LEAK (ON TOP)
NO. 1 R.F.T.
NO. 2 R.F.T.
NO. 3 R.F.T.
1R
2R
3R
D
1A
2A

Fig. 104. Chart for Model 41.

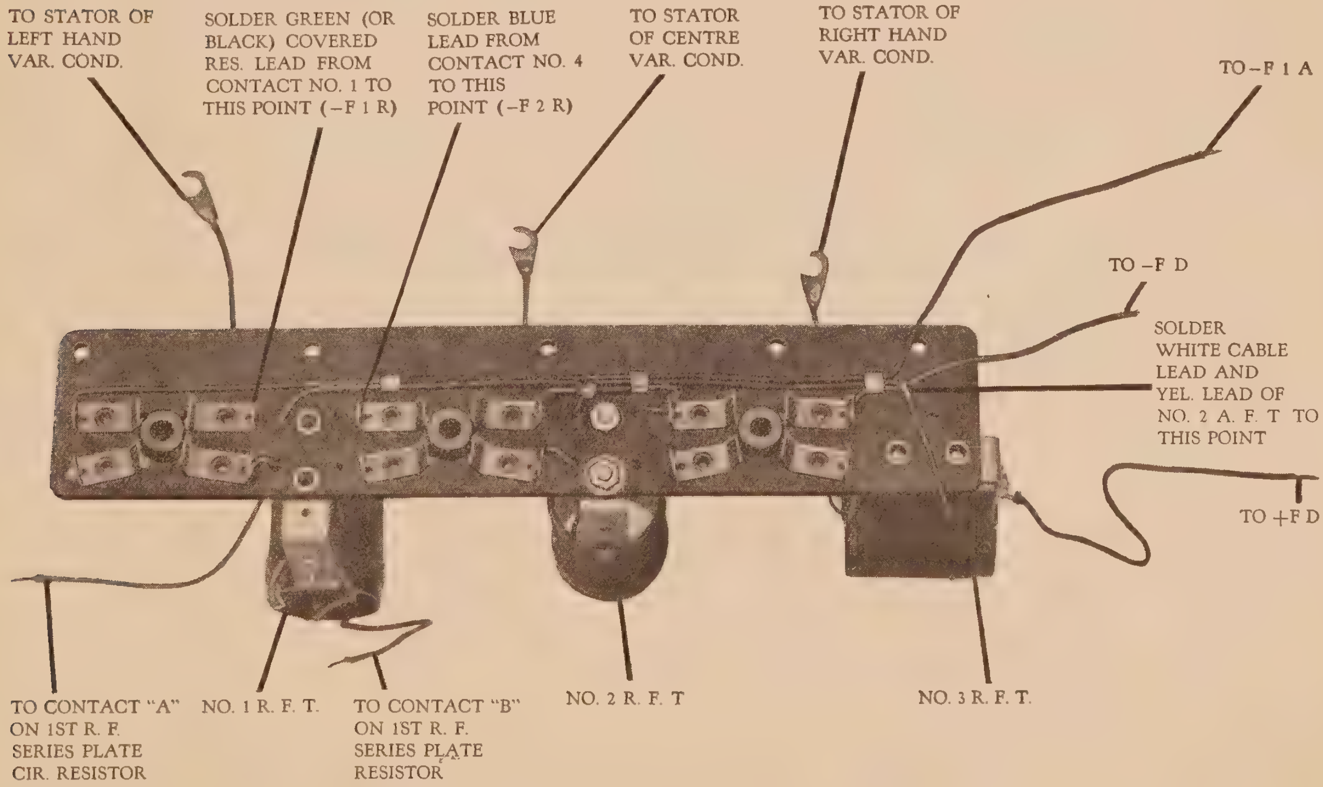

TO STATOR OF LEFT HAND VAR. COND.
SOLDER GREEN (OR BLACK) COVERED RES. LEAD FROM CONTACT NO. 1 TO THIS POINT (−F 1 R)
SOLDER BLUE LEAD FROM CONTACT NO. 4 TO THIS POINT (−F 2 R)
TO STATOR OF CENTRE VAR. COND.
TO STATOR OF RIGHT HAND VAR. COND.
TO −F 1 A
TO −F D
SOLDER WHITE CABLE LEAD AND YEL. LEAD OF NO. 2 A. F. T TO THIS POINT
TO +F D
TO CONTACT "A" ON 1ST R. F. SERIES PLATE CIR. RESISTOR
NO. 1 R. F. T.
TO CONTACT "B" ON 1ST R. F. SERIES PLATE RESISTOR
NO. 2 R. F. T
NO. 3 R. F. T.

Fig. 105. View of R. F. Amplifier Assembly.

MODEL 41 POWER UNIT (3rd Type)

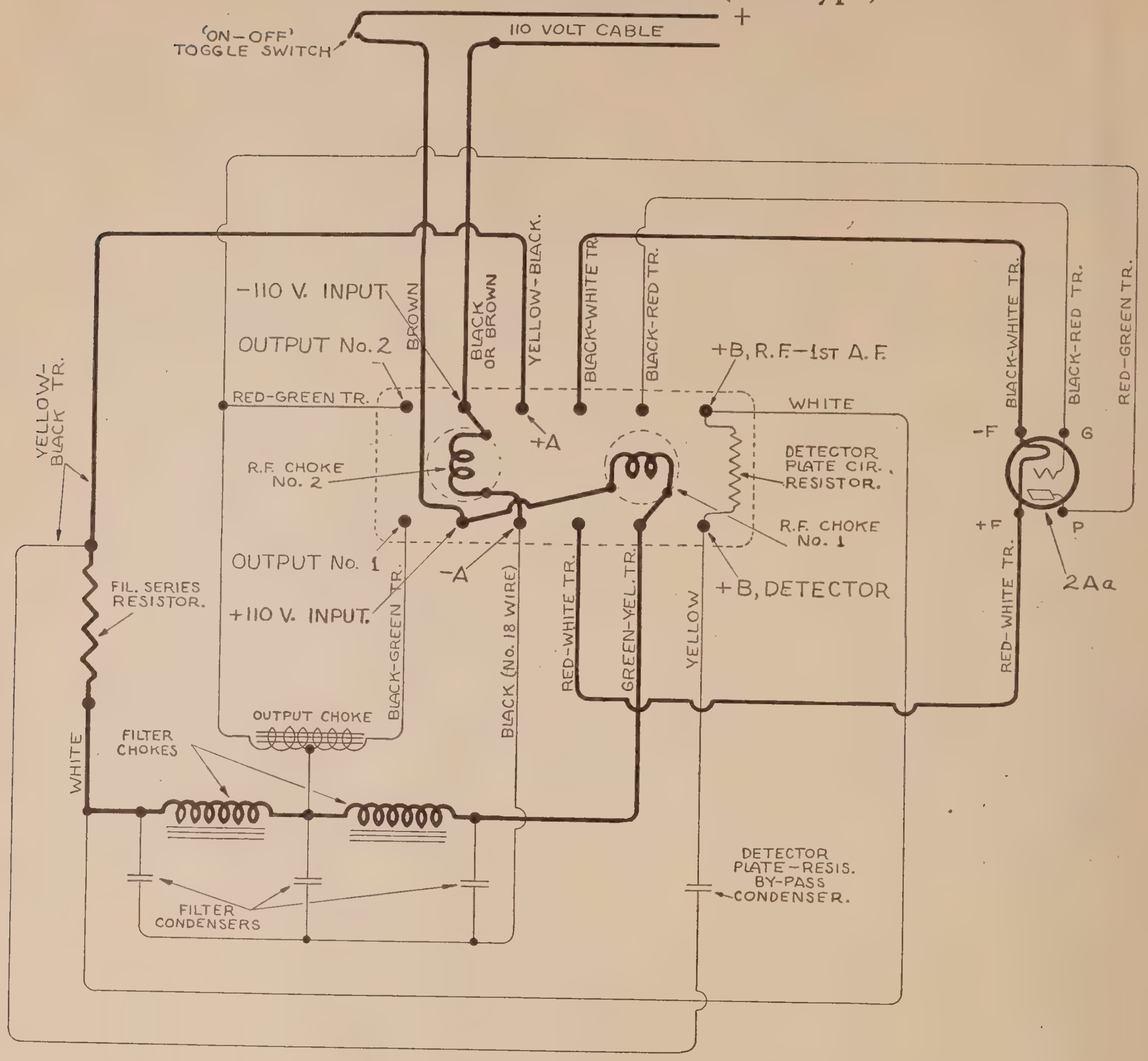

+
'ON-OFF' TOGGLE SWITCH
110 VOLT CABLE
-110 V. INPUT
OUTPUT No. 2
BROWN
BLACK OR BROWN
YELLOW-BLACK.
BLACK-WHITE TR.
BLACK-RED TR.
+B, R.F.-1st A.F.
YELLOW-BLACK TR.
RED-GREEN TR.
+A
WHITE
DETECTOR PLATE CIR. RESISTOR.
R.F. CHOKE No. 2
R.F. CHOKE No. 1
-F
G
+F
P
2Aa
BLACK-WHITE TR.
BLACK-RED TR.
RED-GREEN TR.
OUTPUT No. 1
-A
+110 V. INPUT.
+B, DETECTOR
FIL. SERIES RESISTOR.
BLACK-GREEN TR.
BLACK (No. 18 WIRE)
RED-WHITE TR.
GREEN-YEL. TR.
YELLOW
RED-WHITE TR.
OUTPUT CHOKE
WHITE
FILTER CHOKES
FILTER CONDENSERS
DETECTOR PLATE-RESIS. BY-PASS CONDENSER.

Fig. 106. Wiring Diagram of 3rd Type of Power Unit for Model 41.

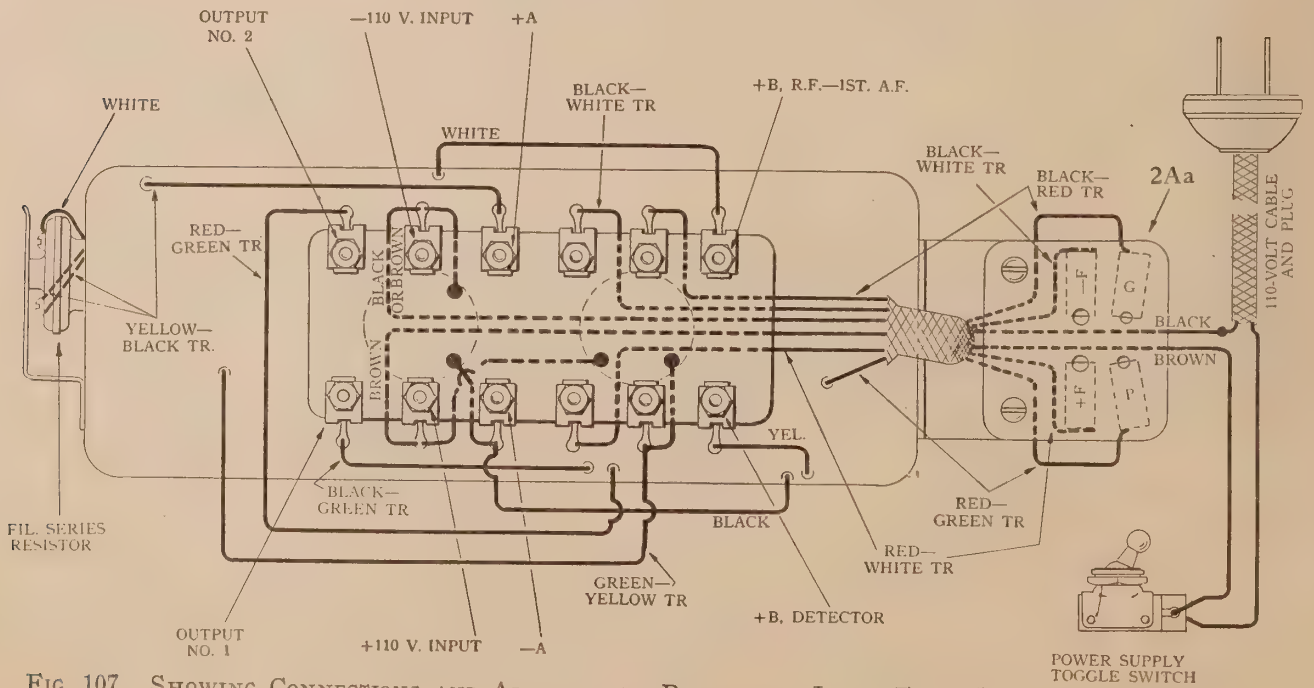

OUTPUT NO. 2
—110 V. INPUT
+A
WHITE
BLACK—WHITE TR
+B, R.F.—1ST. A.F.
WHITE
BLACK—WHITE TR
BLACK—RED TR
2Aa
RED—GREEN TR
BLACK OR BROWN
BROWN
YELLOW—BLACK TR.
-F
G
+F
P
BLACK
BROWN
110-VOLT CABLE AND PLUG
YEL.
BLACK—GREEN TR
BLACK
RED—GREEN TR
RED—WHITE TR
GREEN—YELLOW TR
+B, DETECTOR
FIL. SERIES RESISTOR
OUTPUT NO. 1
+110 V. INPUT
—A
POWER SUPPLY TOGGLE SWITCH

Fig. 107. Showing Connections and Approximate Position of Leads From Sealed Container in 3rd Type of Power Unit.

MODEL 41 POWER UNIT

(1st and 2nd Type)

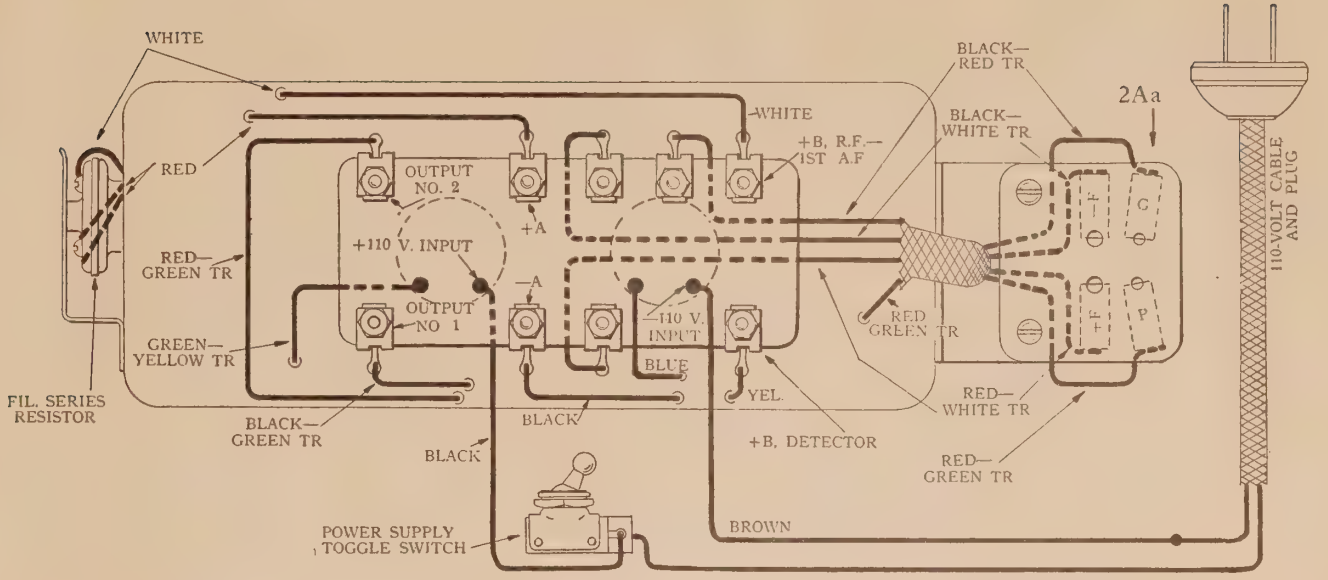

WHITE
RED
RED—GREEN TR
GREEN—YELLOW TR
FIL. SERIES RESISTOR
BLACK—GREEN TR
BLACK
BLACK
OUTPUT NO. 2
+110 V. INPUT
+A
OUTPUT NO 1
—A
—110 V. INPUT
BLUE
YEL.
WHITE
+B, R.F.—1ST A.F
BLACK—RED TR
BLACK—WHITE TR
2Aa
—F
G
+F
P
RED GREEN TR
RED—WHITE TR
RED—GREEN TR
+B, DETECTOR
BROWN
110-VOLT CABLE AND PLUG
POWER SUPPLY TOGGLE SWITCH

Fig. 108. Showing Connections and Approximate Position of Leads From Sealed Container in 1st Type of Power Unit.

Complete direct current power units of the 1st, 2nd and 3rd type are interchangeable in Model 41 receiver. Only the 3rd type is supplied as replacement.

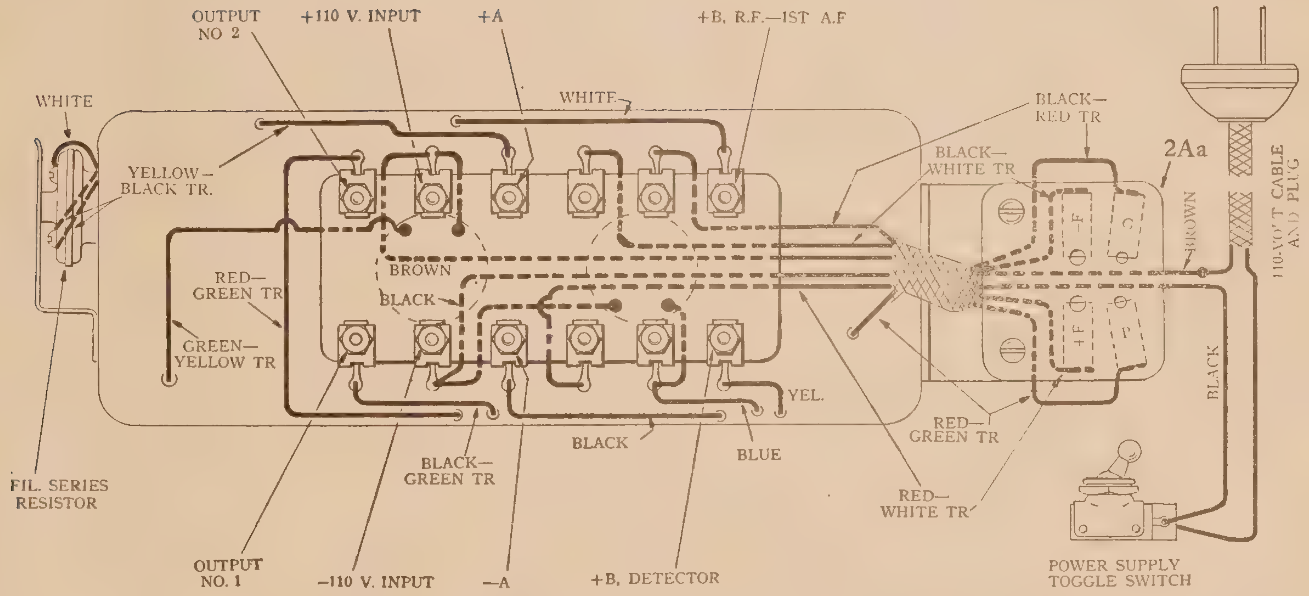

OUTPUT NO 2
+110 V. INPUT
+A
+B, R.F.—1ST A.F
WHITE
WHITE
YELLOW—BLACK TR.
RED—GREEN TR
GREEN—YELLOW TR
BROWN
BLACK
FIL. SERIES RESISTOR
BLACK—GREEN TR
BLACK
BLUE
YEL.
BLACK—RED TR
BLACK—WHITE TR
2Aa
—F
G
+F
P
BROWN
BLACK
110-VOLT CABLE AND PLUG
RED—GREEN TR
RED—WHITE TR
POWER SUPPLY TOGGLE SWITCH
OUTPUT NO. 1
—110 V. INPUT
—A
+B, DETECTOR

Fig. 109. Showing Connections and Approximate Position of Leads From Sealed Container in 2nd Type of Power Unit.

MODEL 43, 46, 47 AND 53

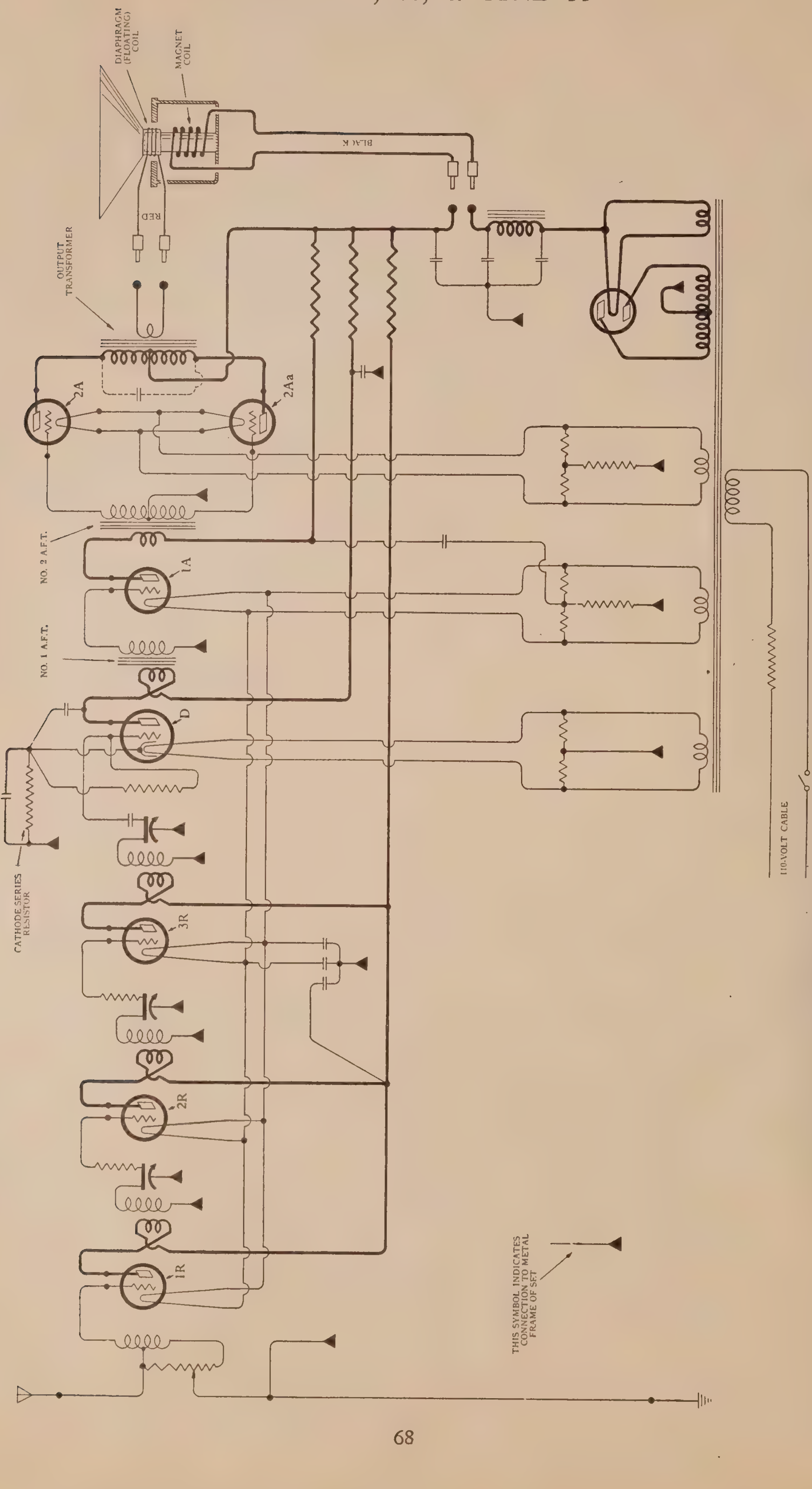

DIAPHRAGM (FLOATING) COIL
MAGNET COIL
BLACK
RED
OUTPUT TRANSFORMER
2A
2Aa
NO. 2 A.F.T.
1A
NO. 1 A.F.T.
D
CATHODE SERIES RESISTOR
3R
2R
1R
THIS SYMBOL INDICATES CONNECTION TO METAL FRAME OF SET
110-VOLT CABLE

FIG. 110. DIAGRAM OF MODEL 43, 46 AND 53. (The output transformer is sealed in the power unit.)
Model 47 is similar to this but has one extra stage of R. F. amplification and a local-distance switch similar to that in Model 44.

MODEL 43, 46, 47 AND 53 DIAGRAM

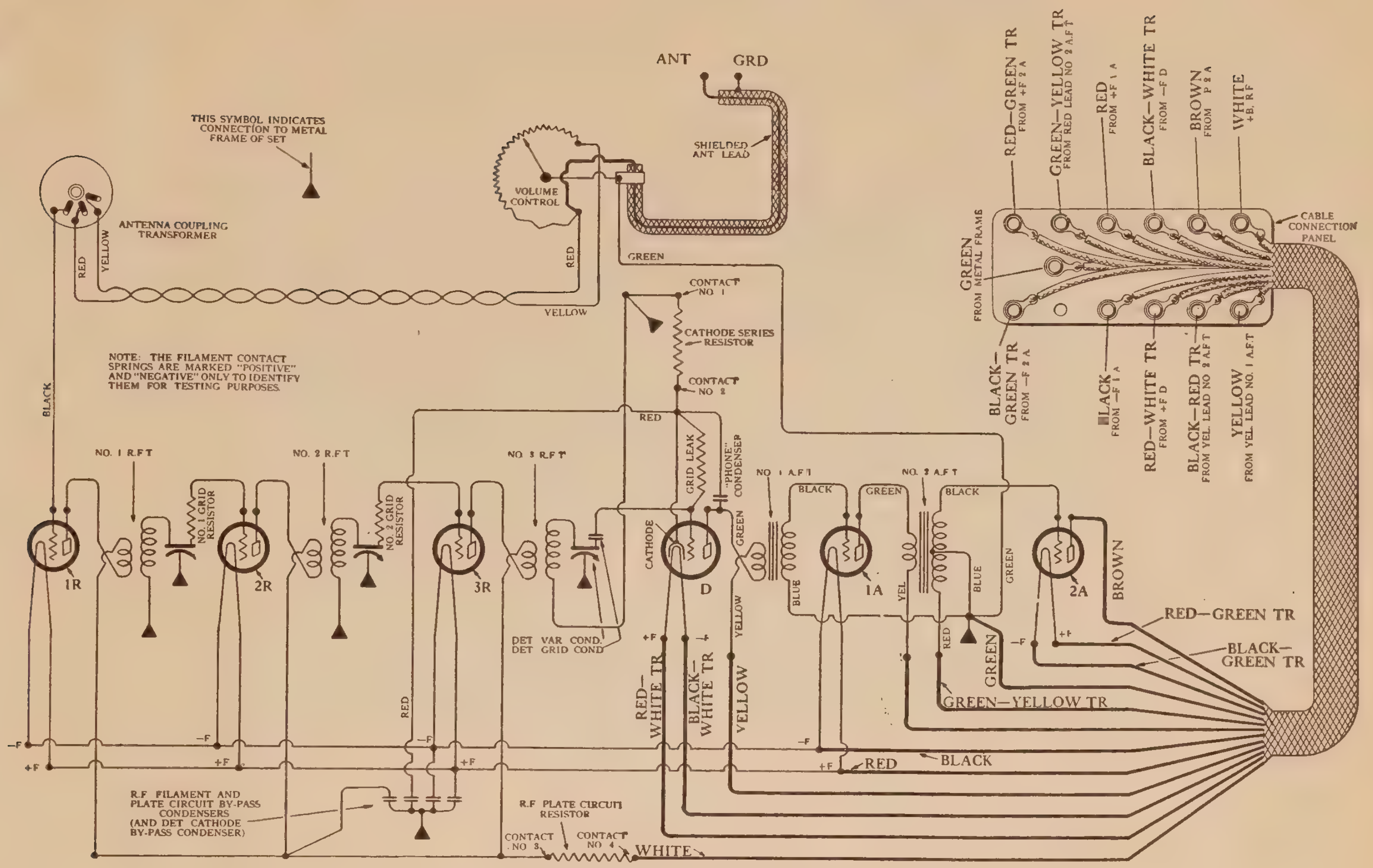

ANT
GRD
THIS SYMBOL INDICATES CONNECTION TO METAL FRAME OF SET
SHIELDED ANT LEAD
VOLUME CONTROL
ANTENNA COUPLING TRANSFORMER
RED
YELLOW
GREEN
CONTACT NO 1
CATHODE SERIES RESISTOR
CONTACT NO 2
NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED "POSITIVE" AND "NEGATIVE" ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
BLACK
NO. 1 R.F.T
NO. 2 R.F.T
NO. 3 R.F.T
NO. 1 GRID RESISTOR
NO. 2 GRID RESISTOR
GRID LEAK
"PHONE" CONDENSER
NO. 1 A.F.T
NO. 2 A.F.T
CATHODE
1R
2R
3R
D
1A
2A
BLUE
YEL
BROWN
DET VAR COND
DET GRID COND
+F
-F
RED—WHITE TR
BLACK—WHITE TR
RED—GREEN TR
BLACK—GREEN TR
GREEN—YELLOW TR
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS (AND DET CATHODE BY-PASS CONDENSER)
R.F. PLATE CIRCUIT RESISTOR
CONTACT NO 3
CONTACT NO 4
WHITE
RED—GREEN TR FROM +F 2 A
GREEN—YELLOW TR FROM RED LEAD NO 2 A.F.T
RED FROM +F 1 A
BLACK—WHITE TR FROM −F D
BROWN FROM P 2 A
WHITE +B, R.F
CABLE CONNECTION PANEL
GREEN FROM METAL FRAME
BLACK—GREEN TR FROM −F 2 A
BLACK FROM −F 1 A
RED—WHITE TR FROM +F D
BLACK—RED TR FROM YEL LEAD NO 2 A.F.T
YELLOW FROM YEL LEAD NO. 1 A.F.T

Fig. 111. Wiring Diagram of Model 43, 46 and 53.
The +B, 1st A. F. cable lead is black with a red tracer.
Model 47 is similar but has one additional stage of R. F. amplification and a local-distance switch like that on Model 44.
See Page 59 for R. F. transformer connections.

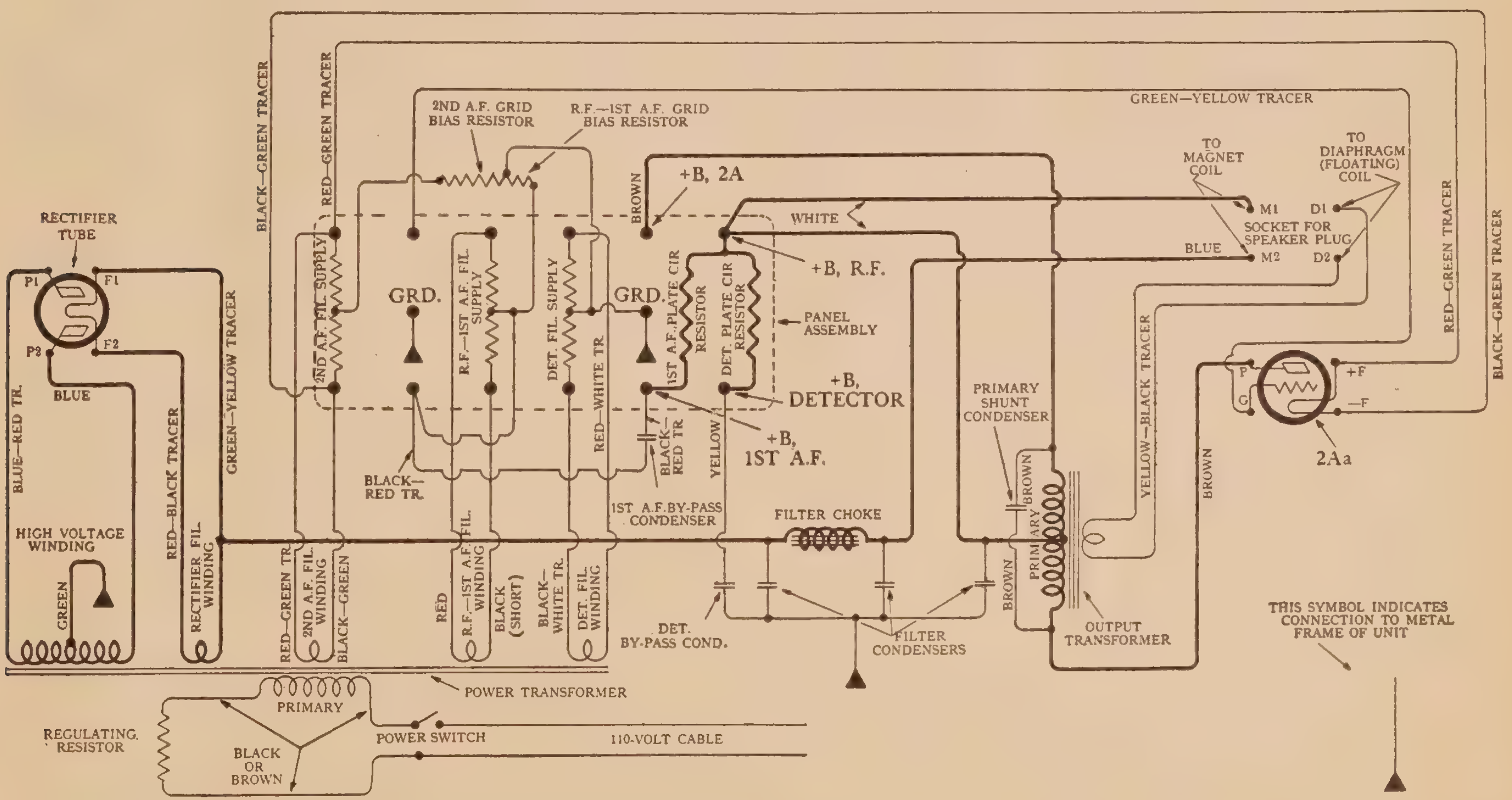

RECTIFIER TUBE
P1
F1
P2
F2
BLUE
BLUE—RED TR.
HIGH VOLTAGE WINDING
GREEN
RED—BLACK TRACER
RECTIFIER FIL WINDING
GREEN—YELLOW TRACER
BLACK—GREEN TRACER
RED—GREEN TRACER
2ND A.F. GRID BIAS RESISTOR
R.F.—1ST A.F. GRID BIAS RESISTOR
2ND A.F. FIL SUPPLY
R.F.—1ST A.F. FIL SUPPLY
DET. FIL SUPPLY
RED—WHITE TR.
GRD.
BROWN
+B, 2A
WHITE
+B, R.F.
1ST A.F. PLATE CIR RESISTOR
DET. PLATE CIR RESISTOR
PANEL ASSEMBLY
+B, DETECTOR
+B, 1ST A.F.
BLACK—RED TR.
YELLOW
1ST A.F. BY-PASS CONDENSER
RED—GREEN TR.
2ND A.F. FIL. WINDING
BLACK—GREEN
RED
R.F.—1ST A.F. FIL. WINDING
BLACK (SHORT)
BLACK—WHITE TR.
DET. FIL WINDING
FILTER CHOKE
DET. BY-PASS COND.
FILTER CONDENSERS
PRIMARY SHUNT CONDENSER
PRIMARY
OUTPUT TRANSFORMER
TO MAGNET COIL
TO DIAPHRAGM (FLOATING) COIL
M1
D1
M2
D2
SOCKET FOR SPEAKER PLUG
YELLOW—BLACK TRACER
P
G
+F
−F
2Aa
THIS SYMBOL INDICATES CONNECTION TO METAL FRAME OF UNIT
POWER TRANSFORMER
REGULATING RESISTOR
BLACK OR BROWN
POWER SWITCH
110-VOLT CABLE

Fig. 112. Wiring Diagram of Power Unit in Model 43.
See Page 70 for power units in Model 46, 47 and 53.

MODEL 43, 46, 47 AND 53 CHARTS

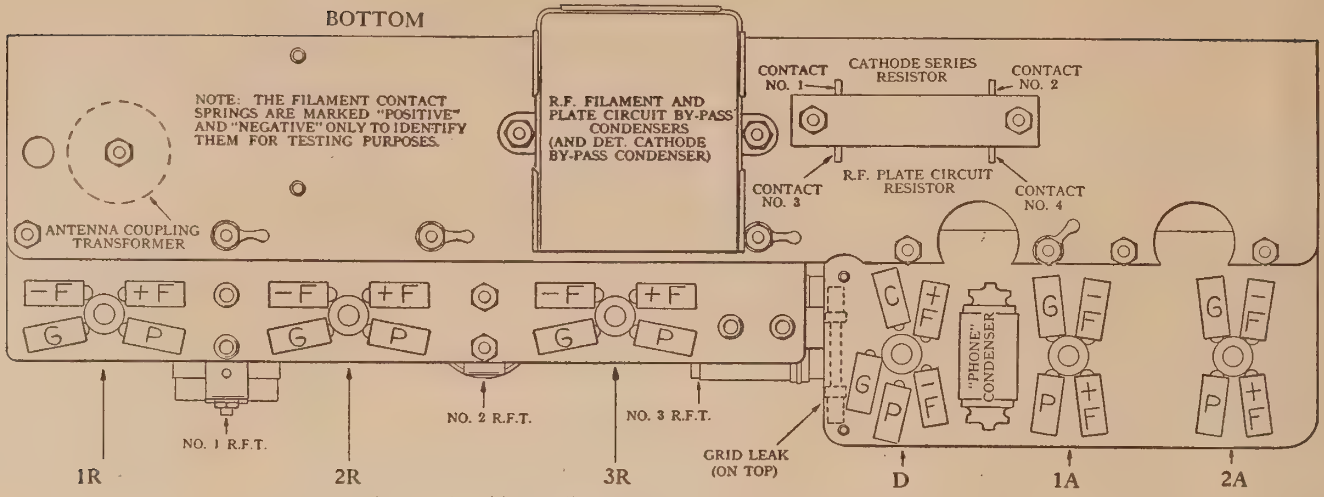

BOTTOM
NOTE: THE FILAMENT CONTACT SPRINGS ARE MARKED "POSITIVE" AND "NEGATIVE" ONLY TO IDENTIFY THEM FOR TESTING PURPOSES.
R.F. FILAMENT AND PLATE CIRCUIT BY-PASS CONDENSERS (AND DET. CATHODE BY-PASS CONDENSER)
CONTACT NO. 1
CATHODE SERIES RESISTOR
CONTACT NO. 2
CONTACT NO. 3
R.F. PLATE CIRCUIT RESISTOR
CONTACT NO. 4
ANTENNA COUPLING TRANSFORMER
−F
+F
G
P
C
"PHONE" CONDENSER
NO. 1 R.F.T.
NO. 2 R.F.T.
NO. 3 R.F.T.
GRID LEAK (ON TOP)
1R
2R
3R
D
1A
2A

FIG. 113. TEST CHART FOR MODEL 43, 46 AND 53.
Model 47 chart is similar except that it has four separate R. F. sockets.

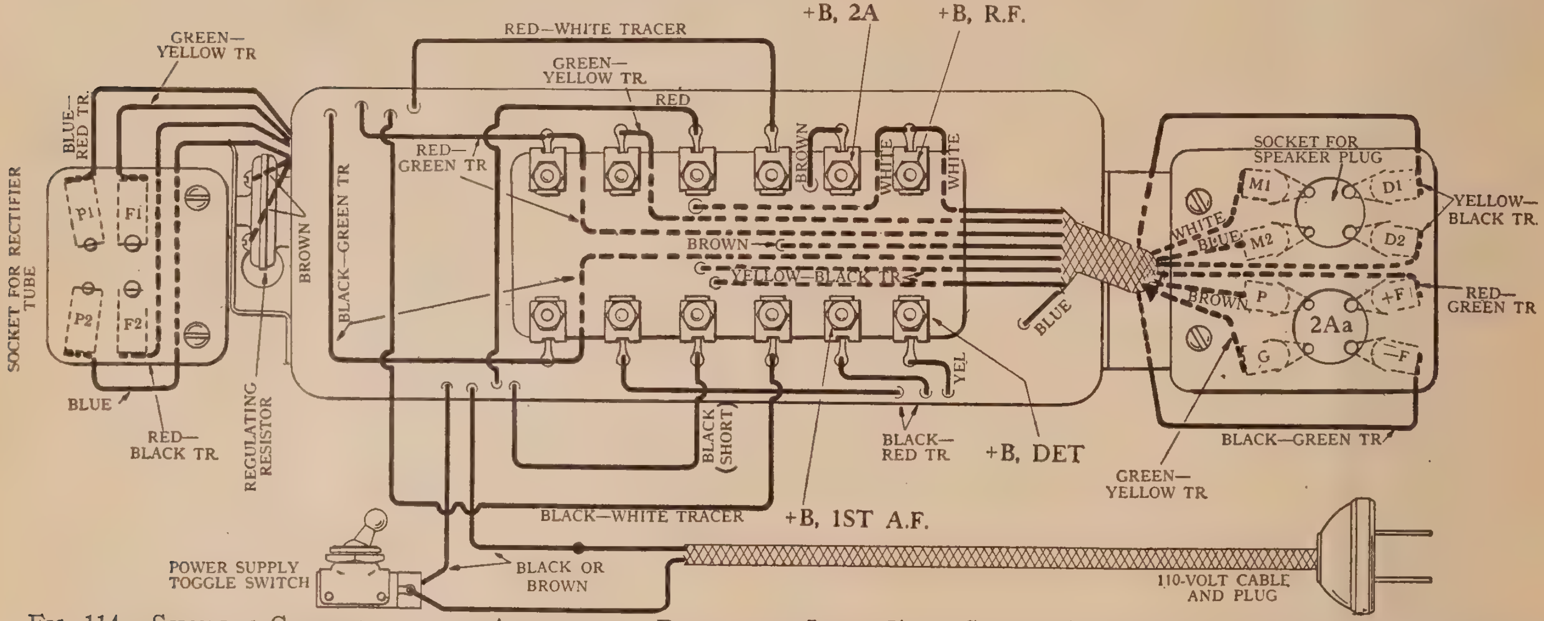

GREEN—YELLOW TR
RED—WHITE TRACER
+B, 2A
+B, R.F.
GREEN—YELLOW TR.
RED
BLUE—RED TR.
RED—GREEN TR
BROWN
WHITE
WHITE
SOCKET FOR SPEAKER PLUG
M1
D1
M2
D2
YELLOW—BLACK TR.
SOCKET FOR RECTIFIER TUBE
P1
F1
P2
F2
BLACK—GREEN TR
BROWN
YELLOW—BLACK TR
BLUE
P
+F
2Aa
G
−F
RED—GREEN TR
BLUE
RED—BLACK TR.
REGULATING RESISTOR
BLACK (SHORT)
YEL
BLACK—RED TR.
+B, DET
BLACK—GREEN TR
GREEN—YELLOW TR
BLACK—WHITE TRACER
+B, 1ST A.F.
POWER SUPPLY TOGGLE SWITCH
BLACK OR BROWN
110-VOLT CABLE AND PLUG

FIG. 114. SHOWING CONNECTIONS AND APPROXIMATE POSITION OF LEADS FROM SEALED CONTAINER IN MODEL 43 POWER UNIT.
In early type of power unit for Model 43, two brown leads from the primary-shunt condenser connect to the +B, 2A terminal and to the brown P2Aa lead respectively. In later models these connections are made internally.

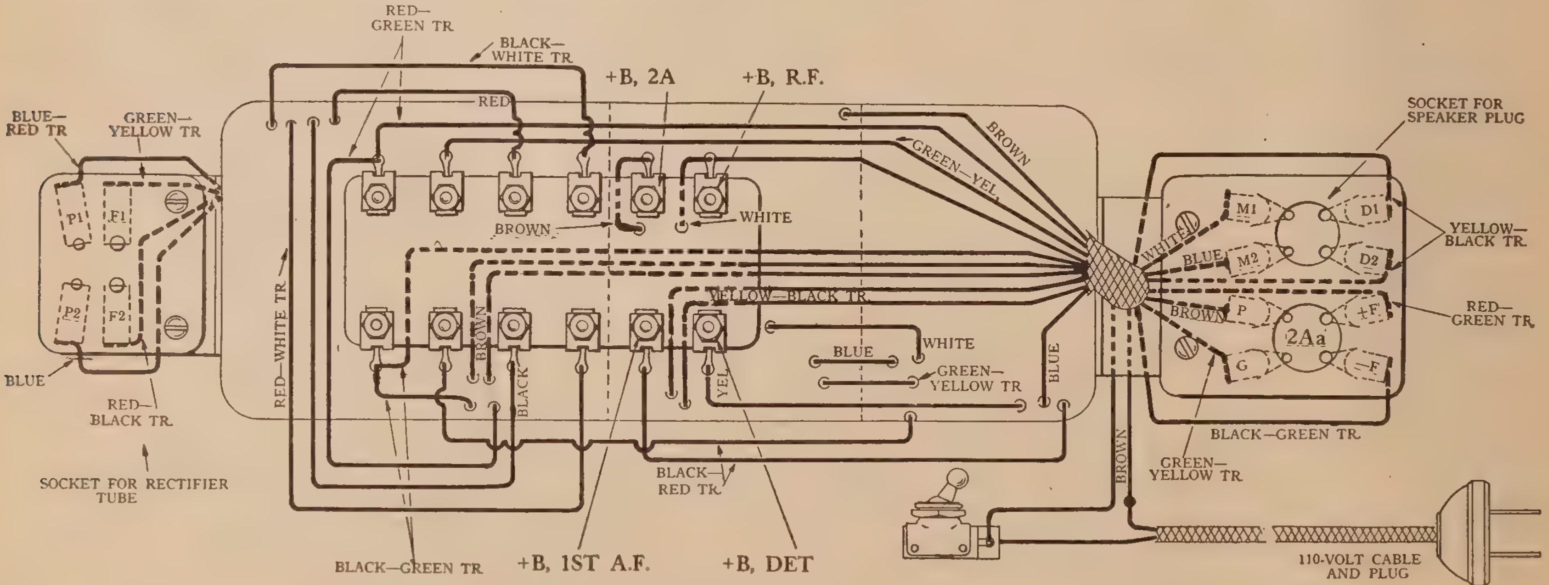

RED—GREEN TR
BLACK—WHITE TR
+B, 2A
+B, R.F.
BLUE—RED TR
GREEN—YELLOW TR
RED
BROWN
GREEN—YEL
SOCKET FOR SPEAKER PLUG
P1
F1
P2
F2
BROWN
WHITE
M1
D1
M2
D2
YELLOW—BLACK TR.
RED—WHITE TR
YELLOW—BLACK TR.
BROWN
BLACK
YEL
BLUE
WHITE
GREEN—YELLOW TR
BLUE
P
+F
2Aa
G
−F
RED—GREEN TR.
BLUE
RED—BLACK TR.
SOCKET FOR RECTIFIER TUBE
BLACK—RED TR.
BLACK—GREEN TR.
GREEN—YELLOW TR
BROWN
BLACK—GREEN TR
+B, 1ST A.F.
+B, DET
110-VOLT CABLE AND PLUG

FIG. 115. SHOWING CONNECTIONS AND APPROXIMATE POSITION OF LEADS FROM SEALED CONTAINER IN POWER UNIT FOR MODEL 46, 47 AND 53.

This view shows the panel assembly moved to the left of its normal position. The replaceable condenser assembly is in the right-hand end of the container. A black lead from the condenser assembly, and a green lead from the transformer assembly are connected to a ground lug under the left-hand panel mounting angle. (Wiring diagram is similar to that on Page 69.) In some units of this type the two leads to D1 and D2 are red (No. 18 wire) instead of yellow-with-black-tracer.

MODEL 50

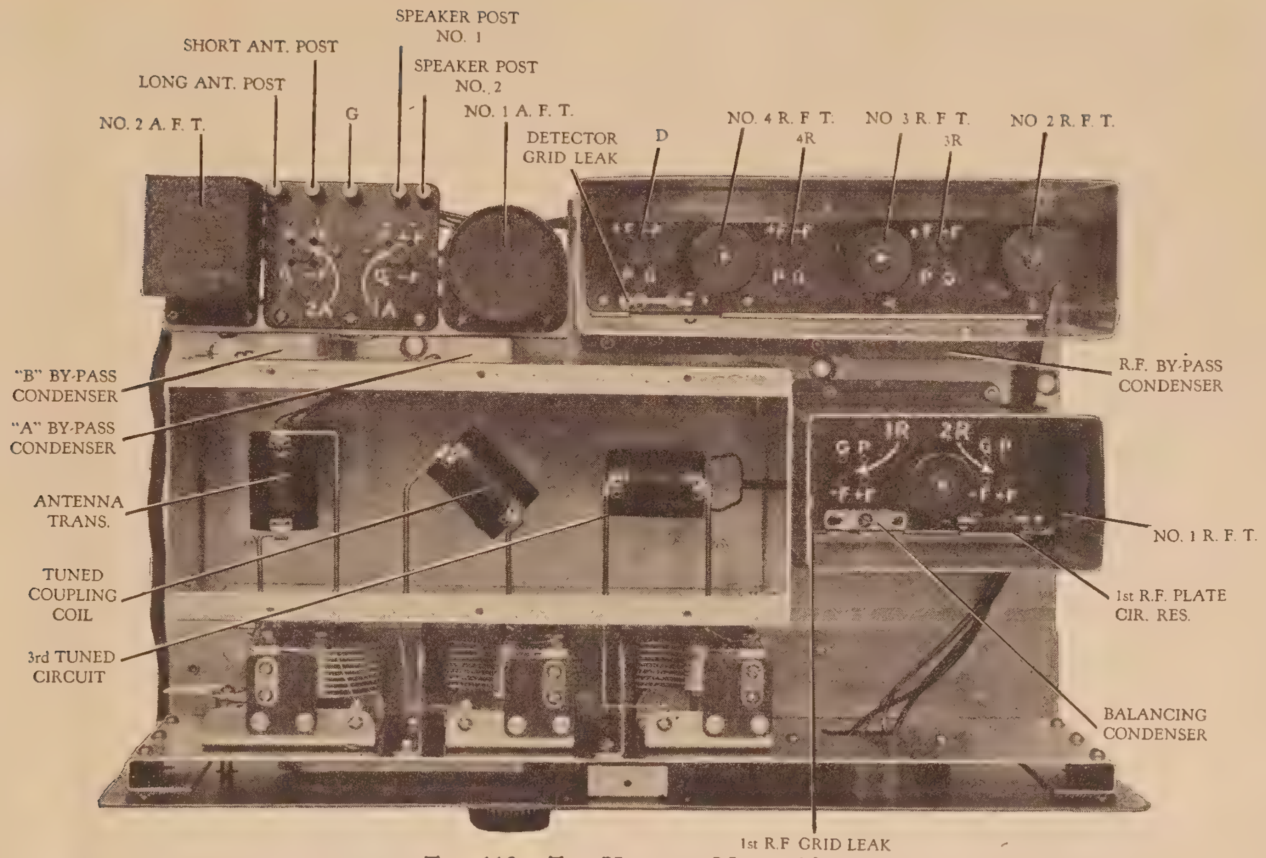

SPEAKER POST NO. 1
SHORT ANT. POST
SPEAKER POST NO. 2
LONG ANT. POST
G
NO. 1 A. F. T.
NO. 2 A. F. T.
DETECTOR GRID LEAK
D
NO. 4 R. F. T.
4R
NO 3 R. F. T.
3R
NO 2 R. F. T.
"B" BY-PASS CONDENSER
"A" BY-PASS CONDENSER
ANTENNA TRANS.
TUNED COUPLING COIL
3rd TUNED CIRCUIT
R.F. BY-PASS CONDENSER
1R
2R
NO. 1 R. F. T.
1st R.F. PLATE CIR. RES.
BALANCING CONDENSER
1st R.F GRID LEAK

Fig. 116. Top View of Model 50.

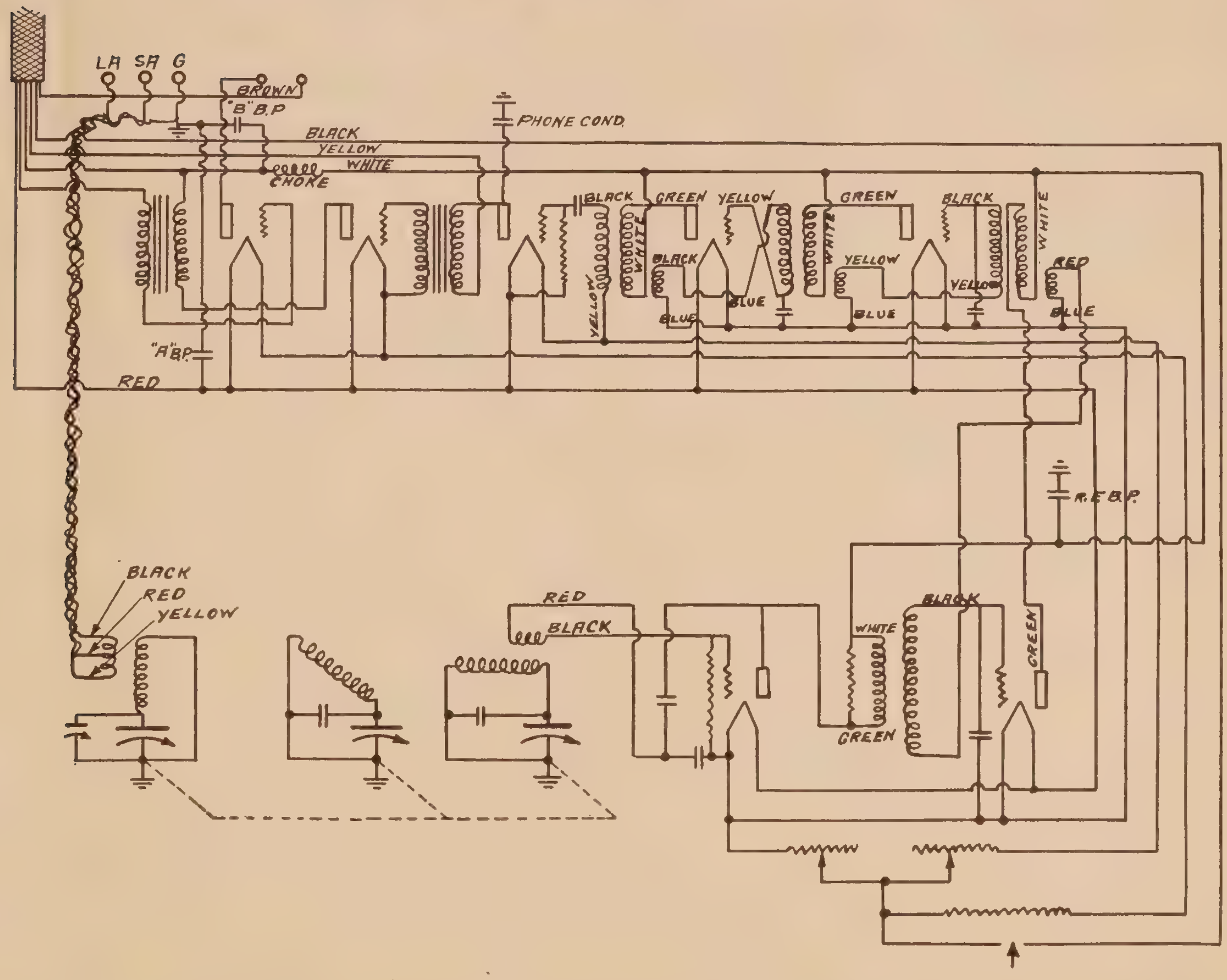

LA
SA
G
BROWN
"B" B.P
PHONE COND.
BLACK
YELLOW
WHITE
CHOKE
BLACK
GREEN
YELLOW
GREEN
BLACK
WHITE
WHITE
BLACK
WHITE
YELLOW
YELLOW
BLUE
BLUE
BLUE
YELLOW
RED
BLUE
"A" B.P.
RED
R.F.B.P.
BLACK
RED
YELLOW
RED
BLACK
WHITE
BLACK
GREEN
GREEN

Fig. 117. Wiring Diagram of Model 50.

The black lead (—F) is grounded—not shown in diagram. Most of Model 50 sets also have an R. F. choke between plate of second audio tube and speaker post No. 1.

MODEL 55 AND 55-C

Voltage Readings on Atwater Kent Model 55, 55-C Receiver (60 Cycle)

Use High Resistance D. C. Voltmeter (About 0-50-250) To Measure Plate and Grid Voltages. Use A. C. Voltmeter To Measure Filament Voltages.

	MEASURE ACROSS	APPROX. VOLTAGE				NO READING INDICATES ‡
		Early Type ††		Later Type ‡‡		
		110 V. Line	120 V. Line	110 V. Line	120 V. Line	
FILAMENT VOLTAGES	—F to +F Contacts on each Receiving Tube Socket.††	2.2	2.4	2.2	2.4	Open filament winding or connection.
	F1 to F2 on Rectifier Tube Socket.	4.5	4.9	4.5	4.9	
PLATE VOLTAGES	C1R to P1R.	160	175	160	175	Open high voltage winding, open speaker magnet coil, open filter choke, open R.F. bias resistor, open primary No. 2 R.F.T., or open R.F.C. No. 1.
	C2R to P2R.	160	175	160	175	Open primary No. 3 R.F.T., or open R.F.C. No. 2.
	CD to PD.	101	110	101	110	Open detector filter resistor, coupling resistor, R.F. choke, or det. bias resistor.†
	C1A to P1A.	64	70	69	75	Open 1st-A.F. filter resistor, primary of A.F. input transformer, or 1st-A.F. bias.
	—F2A to P2A.	213	235	230	250	Open primary of output transformer.
	—F2Aa to P2Aa.	213	235	230	250	
GRID VOLTAGES	C1R to G1R.	2.8	3	3.7	4	Open secondary No. 1 R.F.T.
	C2R to G2R.	2.8	3	3.7	4	Open secondary No. 2 R.F.T.
	CD to GD.	11	12	11	12	Open secondary No. 3 R.F.T.
	C1A to G1A.*	1.8	2	2.8	3	Open 1st-A.F. grid leak.
	—F2A to G2A.	39	42	46	50	Open No. 2 2nd-A.F. bias resistor or secondary of input A.F. transformer.**
	—F2Aa to G2Aa.	39	42	46	50	
SCREEN VOLTAGES	C1R to S1R.	78	85	96	105	Open connection to slider of volume control, open volume-control resistor, or open bleeder resistor.
	C2R to S2R.	78	85	96	105	

* This is the measured voltage, not the actual operating voltage.
** If No. 1 2nd-A. F. bias resistor is open, the grid voltage will be approximately 85.
† The detector plate voltage will be low, and the detector grid voltage high, if the "phone" condenser is shorted.
†† In early-type Model 55 and 55-C, the filaments of the 2nd audio tubes are fed from a separate filament winding on the power transformer.
‡ Low plate, screen, or grid voltages may indicate a partially shorted by-pass or filter condenser.
‡‡ In later Model 55 and 55-C, the primaries of No. 2 and 3 R. F. T. are replaced by R. F. choke coils mounted under the chassis.

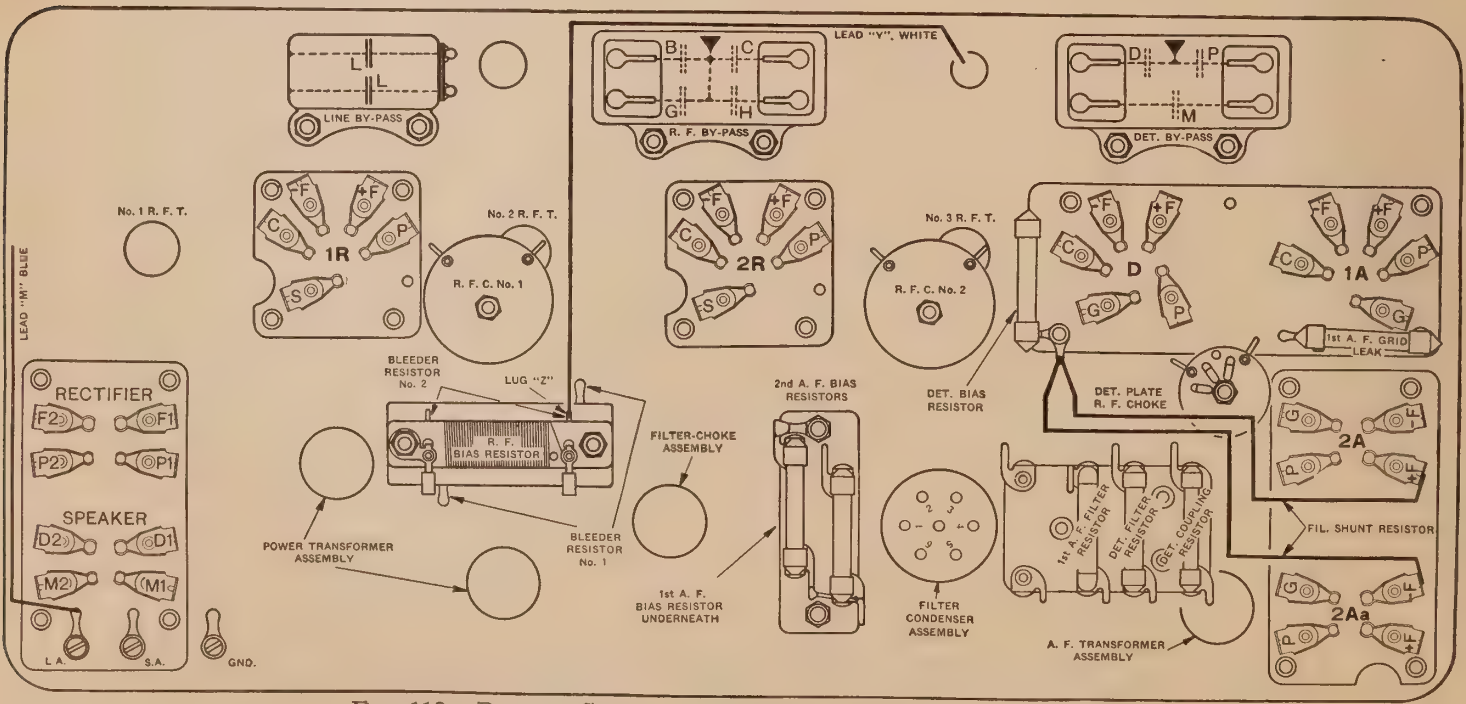

LINE BY-PASS
L
L
R. F. BY-PASS
B
C
G
H
LEAD "Y", WHITE
DET. BY-PASS
D
P
M
No. 1 R. F. T.
1R
No. 2 R. F. T.
R. F. C. No. 1
2R
No. 3 R. F. T.
R. F. C. No. 2
D
1A
1st A. F. GRID LEAK
LEAD "M" BLUE
RECTIFIER
F2
F1
P2
P1
SPEAKER
D2
D1
M2
M1
L. A.
S.A.
GND.
BLEEDER RESISTOR No. 2
LUG "Z"
R. F. BIAS RESISTOR
FILTER-CHOKE ASSEMBLY
POWER TRANSFORMER ASSEMBLY
BLEEDER RESISTOR No. 1
1st A. F. BIAS RESISTOR UNDERNEATH
2nd A. F. BIAS RESISTORS
DET. BIAS RESISTOR
DET. PLATE R. F. CHOKE
FILTER CONDENSER ASSEMBLY
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
A. F. TRANSFORMER ASSEMBLY
2A
FIL. SHUNT RESISTOR
2Aa

Fig. 118. Bottom Chart of Later-Type Model 55 and 55-C.

MODEL 55 AND 55-C

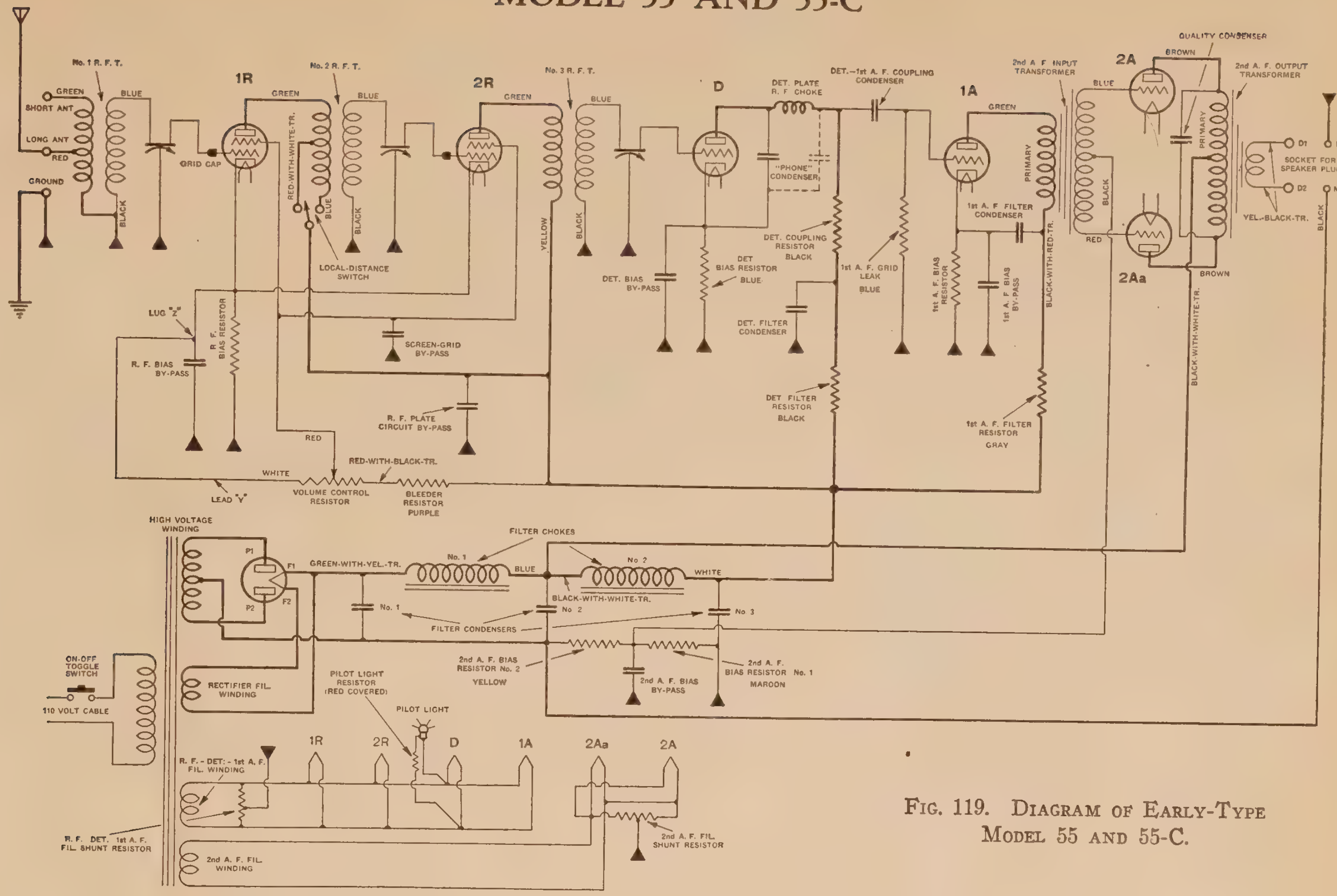

No. 1 R. F. T.
No. 2 R. F. T.
No. 3 R. F. T.
GREEN
SHORT ANT
LONG ANT
RED
GROUND
BLUE
BLACK
1R
2R
D
1A
2A
2Aa
GRID CAP
RED-WITH-WHITE-TR.
LOCAL-DISTANCE SWITCH
YELLOW
DET. PLATE R. F. CHOKE
DET.—1st A. F. COUPLING CONDENSER
"PHONE" CONDENSER
2nd A. F. INPUT TRANSFORMER
QUALITY CONDENSER
BROWN
2nd A. F. OUTPUT TRANSFORMER
PRIMARY
SOCKET FOR SPEAKER PLUG
D1
D2
M1
M2
YEL.-BLACK-TR.
1st A. F. FILTER CONDENSER
DET. COUPLING RESISTOR BLACK
DET BIAS RESISTOR BLUE
DET. BIAS BY-PASS
1st A. F. GRID LEAK BLUE
1st A. F. BIAS RESISTOR
1st A. F. BIAS BY-PASS
BLACK-WITH-RED-TR.
BLACK-WITH-WHITE-TR.
DET. FILTER CONDENSER
DET FILTER RESISTOR BLACK
1st A. F. FILTER RESISTOR GRAY
LUG "Z"
R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
SCREEN-GRID BY-PASS
R. F. PLATE CIRCUIT BY-PASS
RED
RED-WITH-BLACK-TR.
WHITE
LEAD "V"
VOLUME CONTROL RESISTOR
BLEEDER RESISTOR PURPLE
HIGH VOLTAGE WINDING
P1
P2
F1
F2
GREEN-WITH-YEL.-TR.
FILTER CHOKES
No. 1
No. 2
No. 3
BLACK-WITH-WHITE-TR.
FILTER CONDENSERS
2nd A. F. BIAS RESISTOR No. 2 YELLOW
2nd A. F. BIAS BY-PASS
2nd A. F. BIAS RESISTOR No. 1 MAROON
ON-OFF TOGGLE SWITCH
110 VOLT CABLE
RECTIFIER FIL. WINDING
PILOT LIGHT RESISTOR (RED COVERED)
PILOT LIGHT
R. F.-DET.-1st A. F. FIL. WINDING
R. F. DET. 1st A. F. FIL. SHUNT RESISTOR
2nd A. F. FIL. SHUNT RESISTOR
2nd A. F. FIL. WINDING

Fig. 119. Diagram of Early-Type Model 55 and 55-C.

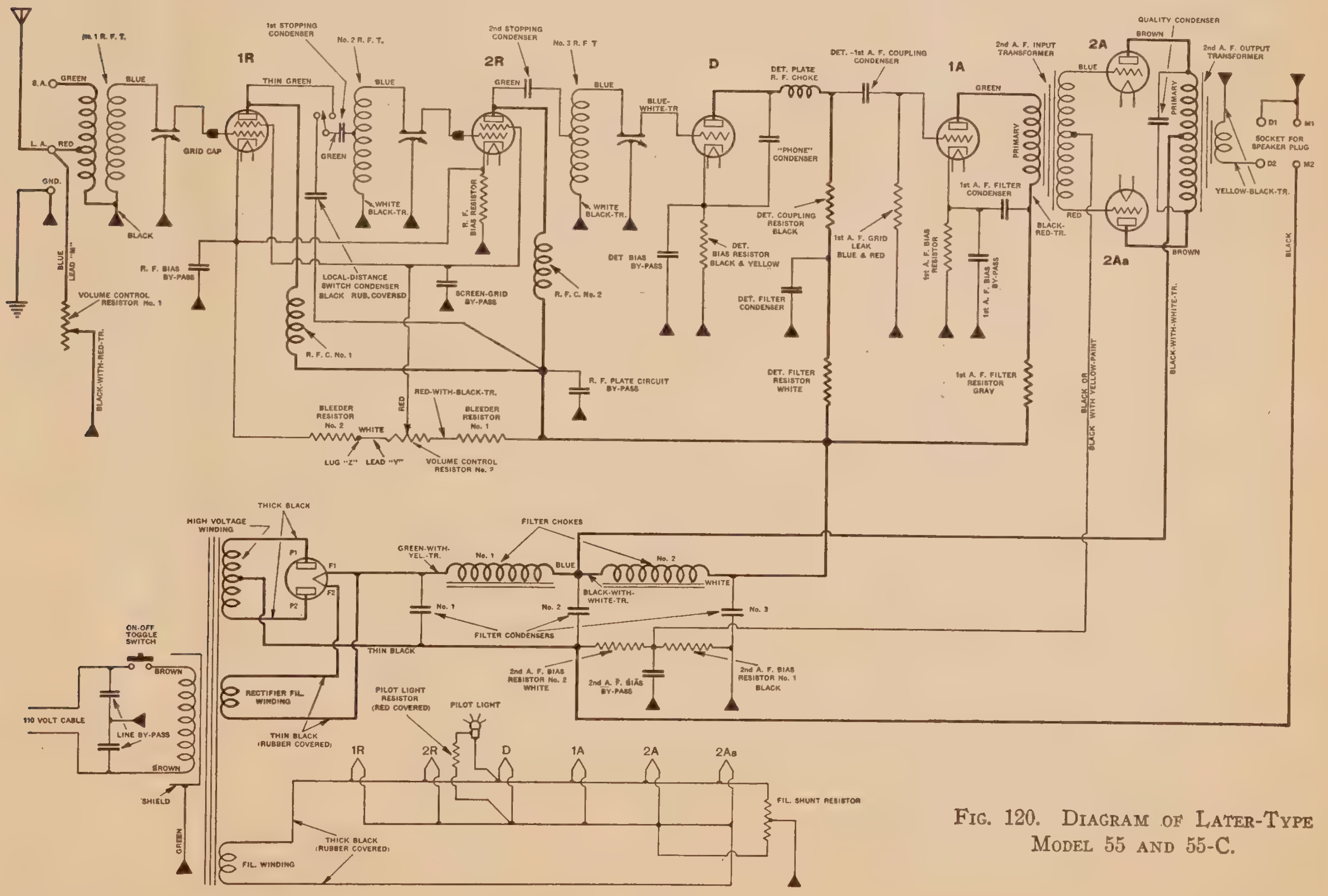

No. 1 R. F. T.
1st STOPPING CONDENSER
No. 2 R. F. T.
2nd STOPPING CONDENSER
No. 3 R. F. T.
S. A.
L. A.
GND.
GREEN
BLUE
RED
BLACK
1R
2R
D
1A
2A
2Aa
THIN GREEN
GRID CAP
BLUE-WHITE-TR
WHITE BLACK-TR.
R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
BLUE LEAD "M"
VOLUME CONTROL RESISTOR No. 1
BLACK-WITH-RED-TR.
LOCAL-DISTANCE SWITCH CONDENSER BLACK RUB. COVERED
SCREEN-GRID BY-PASS
R. F. C. No. 1
R. F. C. No. 2
R. F. PLATE CIRCUIT BY-PASS
RED
RED-WITH-BLACK-TR.
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
WHITE
LUG "Z"
LEAD "V"
VOLUME CONTROL RESISTOR No. 2
DET. PLATE R. F. CHOKE
DET.-1st A. F. COUPLING CONDENSER
"PHONE" CONDENSER
DET. COUPLING RESISTOR BLACK
DET BIAS BY-PASS
DET. BIAS RESISTOR BLACK & YELLOW
1st A. F. GRID LEAK BLUE & RED
DET. FILTER CONDENSER
DET. FILTER RESISTOR WHITE
1st A. F. BIAS RESISTOR
1st A. F. BIAS BY-PASS
1st A. F. FILTER CONDENSER
1st A. F. FILTER RESISTOR GRAY
2nd A. F. INPUT TRANSFORMER
PRIMARY
BLACK-RED-TR.
QUALITY CONDENSER
BROWN
2nd A. F. OUTPUT TRANSFORMER
SOCKET FOR SPEAKER PLUG
D1
D2
M1
M2
YELLOW-BLACK-TR.
BLACK-WITH-WHITE-TR.
BLACK OR BLACK WITH YELLOW-PAINT
THICK BLACK
HIGH VOLTAGE WINDING
P1
P2
F1
F2
GREEN-WITH-YEL.-TR.
FILTER CHOKES
No. 1
No. 2
No. 3
BLACK-WITH-WHITE-TR.
FILTER CONDENSERS
THIN BLACK
2nd A. F. BIAS RESISTOR No. 2 WHITE
2nd A. F. BIAS BY-PASS
2nd A. F. BIAS RESISTOR No. 1 BLACK
ON-OFF TOGGLE SWITCH
BROWN
110 VOLT CABLE
LINE BY-PASS
SHIELD
RECTIFIER FIL. WINDING
THIN BLACK (RUBBER COVERED)
PILOT LIGHT RESISTOR (RED COVERED)
PILOT LIGHT
FIL. SHUNT RESISTOR
THICK BLACK (RUBBER COVERED)
FIL. WINDING

Fig. 120. Diagram of Later-Type Model 55 and 55-C.

MODEL 55 AND 55-C (Early Type)

Connections of R. F. Coil Group No. 15638

No. 1 R. F. T.

Black (1") to chassis.
Blue to stator No. 1 V. C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

Black (1") to chassis.
Blue to stator No. 2 V. C.
Green to P1R.
Blue, and red-white to corresponding leads from local-distance switch.

No. 3 R. F. T.

Black (1") to chassis.
Blue (with lug) to stator No. 3 V. C.
Blue-white to GD.
Green to P2R.
Yellow to by-pass H.

Condensers in Left-Hand By-Pass

B—R. F. bias by-pass.
C—2nd-A. F. bias by-pass.
G—Screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in Right-Hand By-Pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.
P—"Phone" condenser.

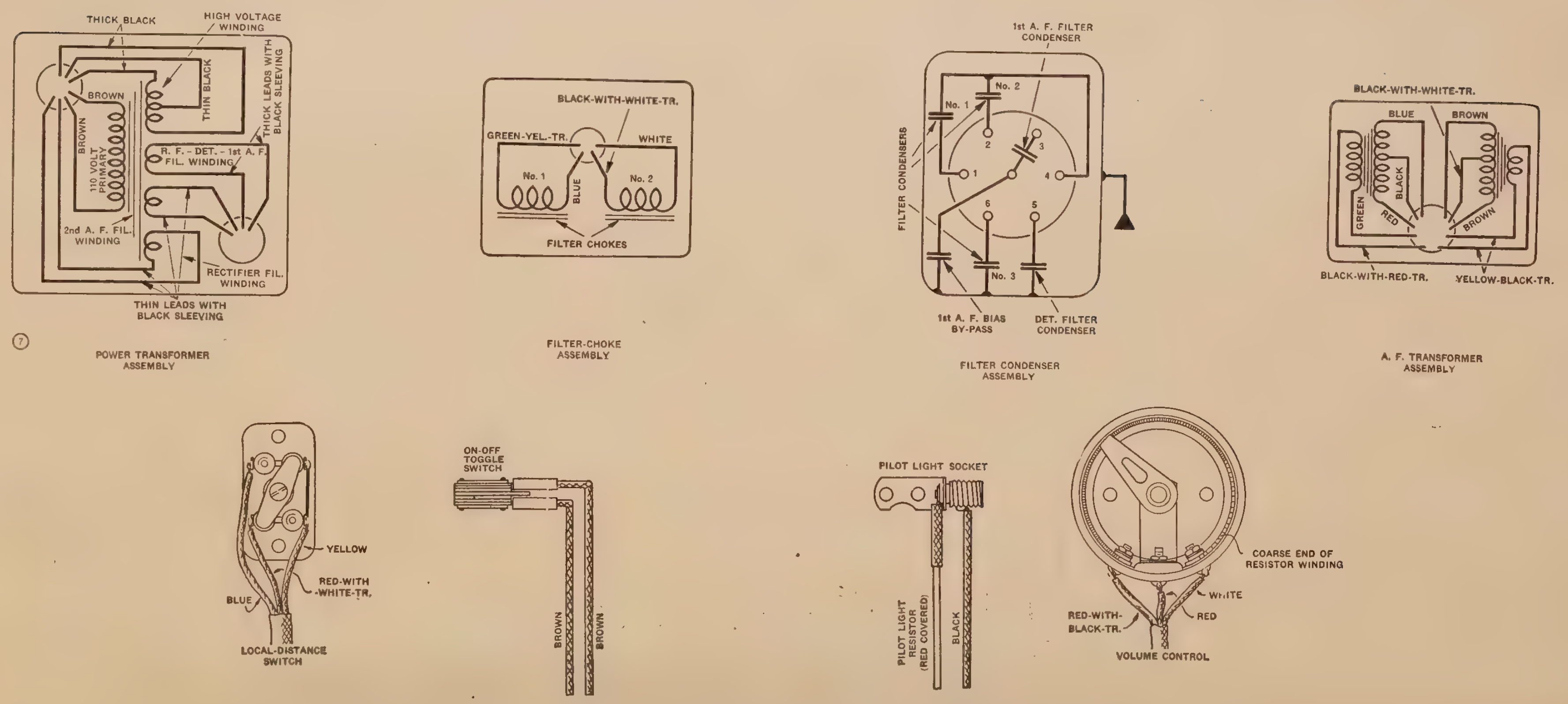

THICK BLACK
HIGH VOLTAGE WINDING
BROWN
BROWN
110 VOLT PRIMARY
THIN BLACK
THICK LEADS WITH BLACK SLEEVING
R. F. - DET. - 1st A. F. FIL. WINDING
2nd A. F. FIL. WINDING
RECTIFIER FIL. WINDING
THIN LEADS WITH BLACK SLEEVING
⑦
POWER TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
WHITE
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
1st A. F. FILTER CONDENSER
No. 1
No. 2
1
2
3
4
5
6
No. 3
FILTER CONDENSERS
1st A. F. BIAS BY-PASS
DET. FILTER CONDENSER
FILTER CONDENSER ASSEMBLY
BLACK-WITH-WHITE-TR.
BLUE
BROWN
GREEN
RED
BLACK
BROWN
BLACK-WITH-RED-TR.
YELLOW-BLACK-TR.
A. F. TRANSFORMER ASSEMBLY
YELLOW
RED-WITH -WHITE-TR.
BLUE
LOCAL-DISTANCE SWITCH
ON-OFF TOGGLE SWITCH
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED)
BLACK
COARSE END OF RESISTOR WINDING
WHITE
RED
RED-WITH-BLACK-TR.
VOLUME CONTROL

Fig. 121. Connections of Units in Early-Type Model 55 and 55-C.

MODEL 55 AND 55-C (Early Type)

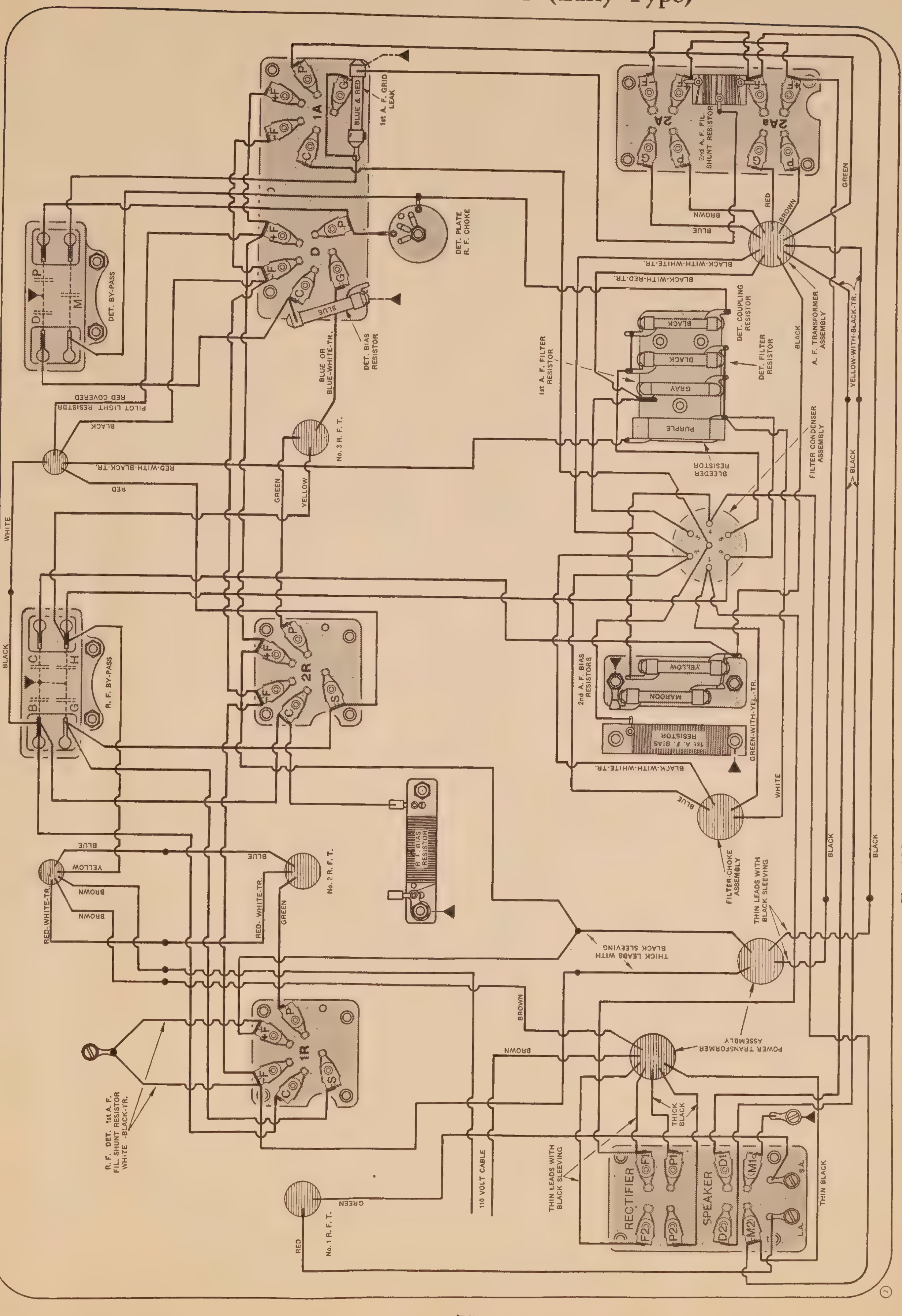

1A
P
G
+F
-F
C
BLUE & RED
1st A. F. GRID LEAK
2A
2Aa
2nd A. F. FIL. SHUNT RESISTOR
RED
BROWN
BLUE
GREEN
BLACK-WITH-WHITE-TR.
BLACK-WITH-RED-TR.
D
DET. PLATE R. F. CHOKE
BLUE
DET. BIAS RESISTOR
BLUE OR BLUE-WHITE-TR.
DET. BY-PASS
D
P
M
RED COVERED
PILOT LIGHT RESISTOR
BLACK
RED-WITH-BLACK-TR.
RED
No. 3 R. F. T.
GREEN
YELLOW
WHITE
DET. COUPLING RESISTOR
BLACK
BLACK
GRAY
PURPLE
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
BLEEDER RESISTOR
A. F. TRANSFORMER ASSEMBLY
FILTER CONDENSER ASSEMBLY
YELLOW-WITH-BLACK-TR.
BLACK
2R
S
R. F. BY-PASS
C
H
B
G
2nd A. F. BIAS RESISTORS
YELLOW
MAROON
1st A. F. BIAS RESISTOR
GREEN-WITH-YEL.-TR.
BLACK-WITH-WHITE-TR.
WHITE
FILTER-CHOKE ASSEMBLY
R. F. BIAS RESISTOR
No. 2 R. F. T.
RED-WHITE-TR.
BLUE
YELLOW
BROWN
THIN LEADS WITH BLACK SLEEVING
THICK LEADS WITH BLACK SLEEVING
1R
POWER TRANSFORMER ASSEMBLY
THICK BLACK
R. F. DET. 1st A. F. FIL. SHUNT RESISTOR WHITE -BLACK-TR.
110 VOLT CABLE
No. 1 R. F. T.
GREEN
RED
RECTIFIER
F1
F2
P1
P2
SPEAKER
D1
D2
M1
M2
S.A.
L.A.
THIN BLACK

Fig. 122. Bottom Wiring of Early-Type Model 55 and 55-C.

This drawing shows the new-style R. F. bias resistor. In some early sets, a separate double-type phone condenser is used. See Page 107 for connections.

MODEL 55 AND 55-C (Later Type)

Connections of R. F. Coil Group No. 16990

The colors of the leads to chassis and to the variable condensers are in some cases different from those specified below.

No. 1 R. F. T.

Black (1") to chassis.
Blue-white-tr. (5") to stator No. 1 V.C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

White-black-tr. (1") to chassis.
Blue-white-tr. to stator No. 2 V. C.
Green to green lead from local-distance switch.

No. 3 R. F. T.

White-black-tr. (1") to chassis.
Blue (with lug) to stator No. 3 V.C.
Blue-white-tracer to GD.
Green to P2R.

Condensers in Line By-pass

L—Line by-pass.
L—Line by-pass.

Condensers in R. F. By-pass

B—R. F. bias by-pass.
C—2nd-A. F. bias by-pass.
G—Screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in Detector By-pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.
P—"Phone" condenser.

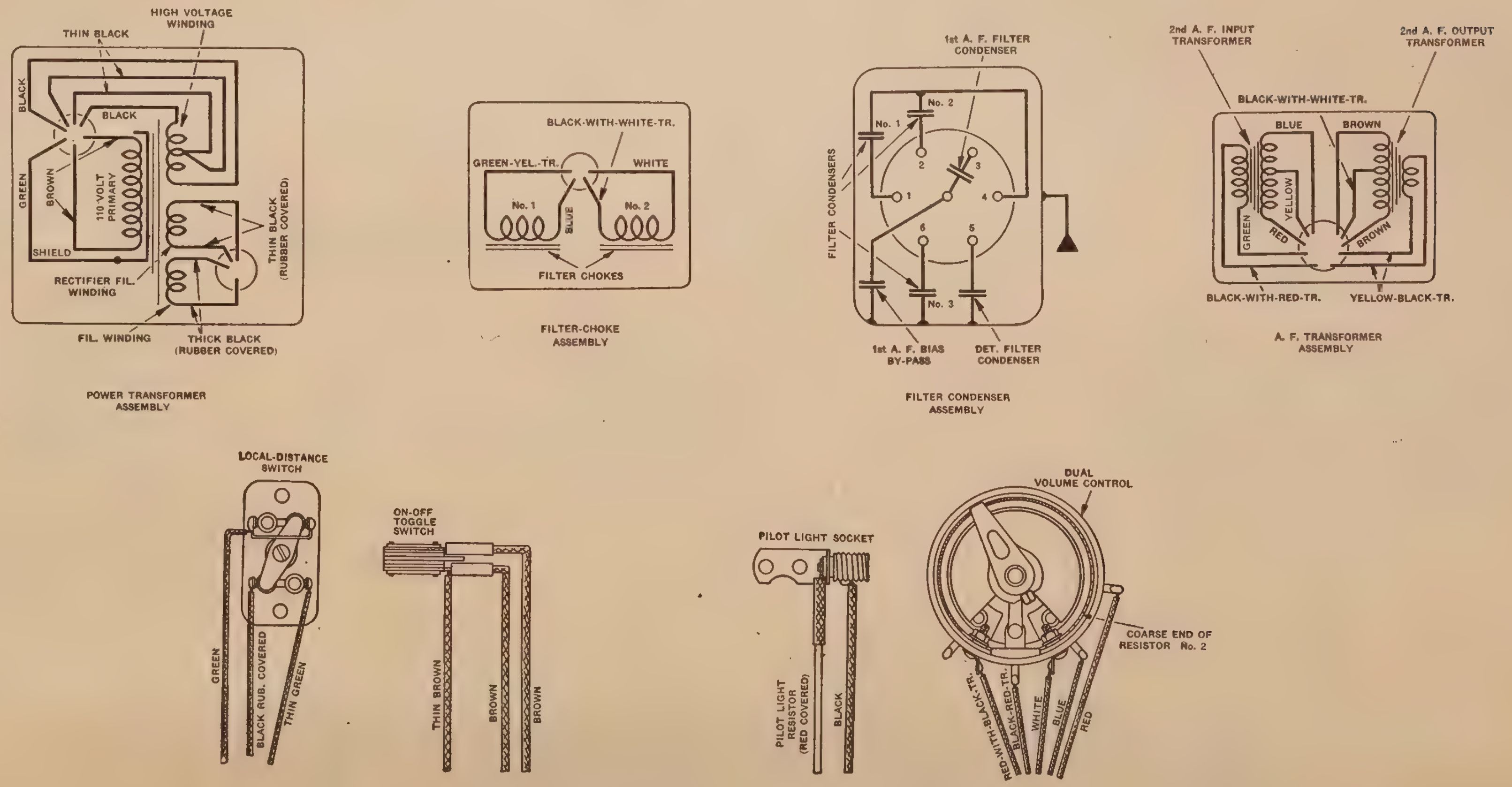

HIGH VOLTAGE WINDING
THIN BLACK
BLACK
BLACK
GREEN
BROWN
110 VOLT PRIMARY
SHIELD
RECTIFIER FIL. WINDING
THIN BLACK (RUBBER COVERED)
FIL. WINDING
THICK BLACK (RUBBER COVERED)
POWER TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
WHITE
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
1st A. F. FILTER CONDENSER
No. 1
No. 2
No. 3
1
2
3
4
5
6
FILTER CONDENSERS
1st A. F. BIAS BY-PASS
DET. FILTER CONDENSER
FILTER CONDENSER ASSEMBLY
2nd A. F. INPUT TRANSFORMER
2nd A. F. OUTPUT TRANSFORMER
BLACK-WITH-WHITE-TR.
BLUE
BROWN
GREEN
YELLOW
RED
BROWN
BLACK-WITH-RED-TR.
YELLOW-BLACK-TR.
A. F. TRANSFORMER ASSEMBLY
LOCAL-DISTANCE SWITCH
GREEN
BLACK RUB. COVERED
THIN GREEN
ON-OFF TOGGLE SWITCH
THIN BROWN
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED)
BLACK
DUAL VOLUME CONTROL
COARSE END OF RESISTOR No. 2
RED-WITH-BLACK-TR.
BLACK-RED-TR.
WHITE
BLUE
RED

FIG. 123. CONNECTIONS OF UNITS IN LATER-TYPE MODEL 55 AND 55-C.

The center-tap of the input A. F. transformer is sometimes black-with-yellow-paint. A "quality" condenser, not shown above, is connected across the primary (large winding) of the 2nd-A. F. output transformer.

MODEL 55 AND 55-C (Later Type)

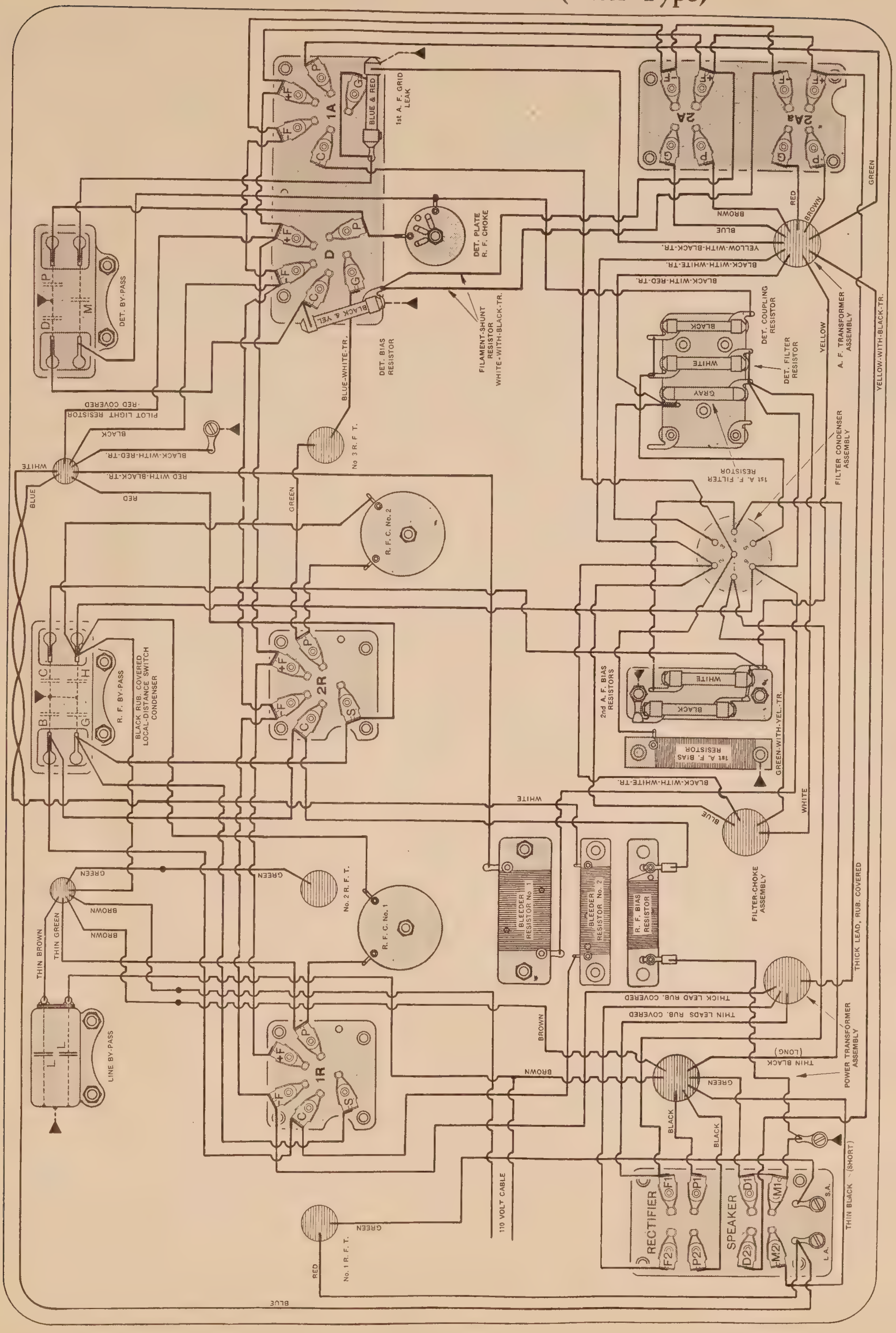

1A
+F
-F
P
G
C
BLUE & RED
1st A. F. GRID LEAK
2A
2Aa
DET. BY-PASS
D
P
M
DET. PLATE R. F. CHOKE
BLACK & YEL
DET. BIAS RESISTOR
FILAMENT-SHUNT RESISTOR WHITE-WITH-BLACK-TR.
BLUE-WHITE-TR.
No 3 R. F. T.
RED
BROWN
BLUE
YELLOW-WITH-BLACK-TR.
BLACK-WITH-WHITE-TR.
BLACK-WITH-RED-TR.
GREEN
YELLOW
YELLOW-WITH-BLACK-TR.
A. F. TRANSFORMER ASSEMBLY
BLACK
WHITE
GRAY
DET. COUPLING RESISTOR
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
FILTER CONDENSER ASSEMBLY
RED COVERED
PILOT LIGHT RESISTOR
BLACK
BLACK-WITH-RED-TR.
WHITE
RED WITH-BLACK-TR.
RED
BLUE
GREEN
R. F. C. No. 2
R. F. BY-PASS
BLACK RUB. COVERED LOCAL-DISTANCE SWITCH CONDENSER
C
H
B
G
2R
S
2nd A. F. BIAS RESISTORS
WHITE
BLACK
1st A. F. BIAS RESISTOR
GREEN-WITH-YEL.-TR.
BLACK-WITH-WHITE-TR.
WHITE
BLUE
WHITE
FILTER-CHOKE ASSEMBLY
GREEN
BROWN
BROWN
THIN BROWN
THIN GREEN
GREEN
No. 2 R. F. T.
R. F. C. No. 1
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 2
R. F. BIAS RESISTOR
THICK LEAD, RUB. COVERED
THICK LEAD RUB. COVERED
THIN LEADS RUB. COVERED
POWER TRANSFORMER ASSEMBLY
THIN BLACK (LONG)
L
L
LINE BY-PASS
BROWN
BROWN
1R
GREEN
BLACK
BLACK
RECTIFIER
F1
P1
F2
P2
SPEAKER
D1
M1
D2
M2
S.A.
L.A.
THIN BLACK (SHORT)
110 VOLT CABLE
GREEN
No. 1 R. F. T.
RED
BLUE

FIG. 124. BOTTOM WIRING OF LATER-TYPE MODEL 55 AND 55-C.

The 1st-A. F. bias resistor is mounted under the base of the 2nd-A. F. bias resistors. The other three wire-wound resistors are mounted together, being insulated from each other by sheets of fibre.

MODEL 55-F AND 55-F-C

Voltage Readings on Atwater Kent Model 55-F, 55-F-C Receiver (25 Cycle)

Use High Resistance D. C. Voltmeter (About 0-50-250) To Measure Plate and Grid Voltages. Use A. C. Voltmeter To Measure Filament Voltages.

	MEASURE ACROSS	APPROX. VOLTAGE		NO READING INDICATES ‡
		110 V. Line	120 V. Line	
FILAMENT VOLTAGES	—F to +F Contacts on the detector, 1st-A.F. and each R.F. Socket.	2.2	2.4	Open filament winding or connection.
	—F to +F on each 2nd-A.F. Socket.	4.5	4.9	
	F1 to F2 on Rectifier Tube Socket.	4.5	4.9	
PLATE VOLTAGES	C1R to P1R.	160	175	Open high voltage winding, open speaker magnet coil, open filter choke, open primary No. 2 R.F.T., or open R.F. bias resistor.**
	C2R to P2R.	160	175	Open primary No. 3 R.F.T.**
	CD to PD.	101	110	Open detector filter resistor, coupling resistor, R.F. choke, or det. bias resistor.†
	C1A to P1A.	69	75	Open 1st-A.F. filter resistor, primary of A.F. input transformer, or 1st-A.F. bias.
	—F2A to P2A.	174	190	Open primary of output transformer, or 2nd-A.F. bias resistor.
	—F2Aa to P2Aa.	174	190	
GRID VOLTAGES	C1R to G1R.	3.7	4	Open secondary No. 1 R.F.T.
	C2R to G2R.	3.7	4	Open secondary No. 2 R.F.T.
	CD to GD.	11	12	Open secondary No. 3 R.F.T.
	C1A to G1A.*	2.8	3	Open 1st-A.F. grid leak.
	—F2A to G2A.	41	45	Open 2nd-A.F. bias resistor, or secondary of input A.F. transformer.
	—F2Aa to G2Aa.	41	45	
SCREEN VOLTAGES	C1R to S1R.	96	105	Open connection to slider of volume control, open volume-control resistor, or open bleeder resistor.
	C2R to S2R.	96	105	

* This is the measured voltage, not the actual operating voltage.

** In later Model 55-F and 55-F-C, the primaries of No. 2 and 3 R.F.T. are replaced by R.F. choke coils mounted under the chassis.

† The detector plate voltage will be low, and the detector grid voltage high, if the "phone" condenser is shorted.

‡ Low plate, screen, or grid voltages may indicate a partially shorted by-pass or filter condenser.

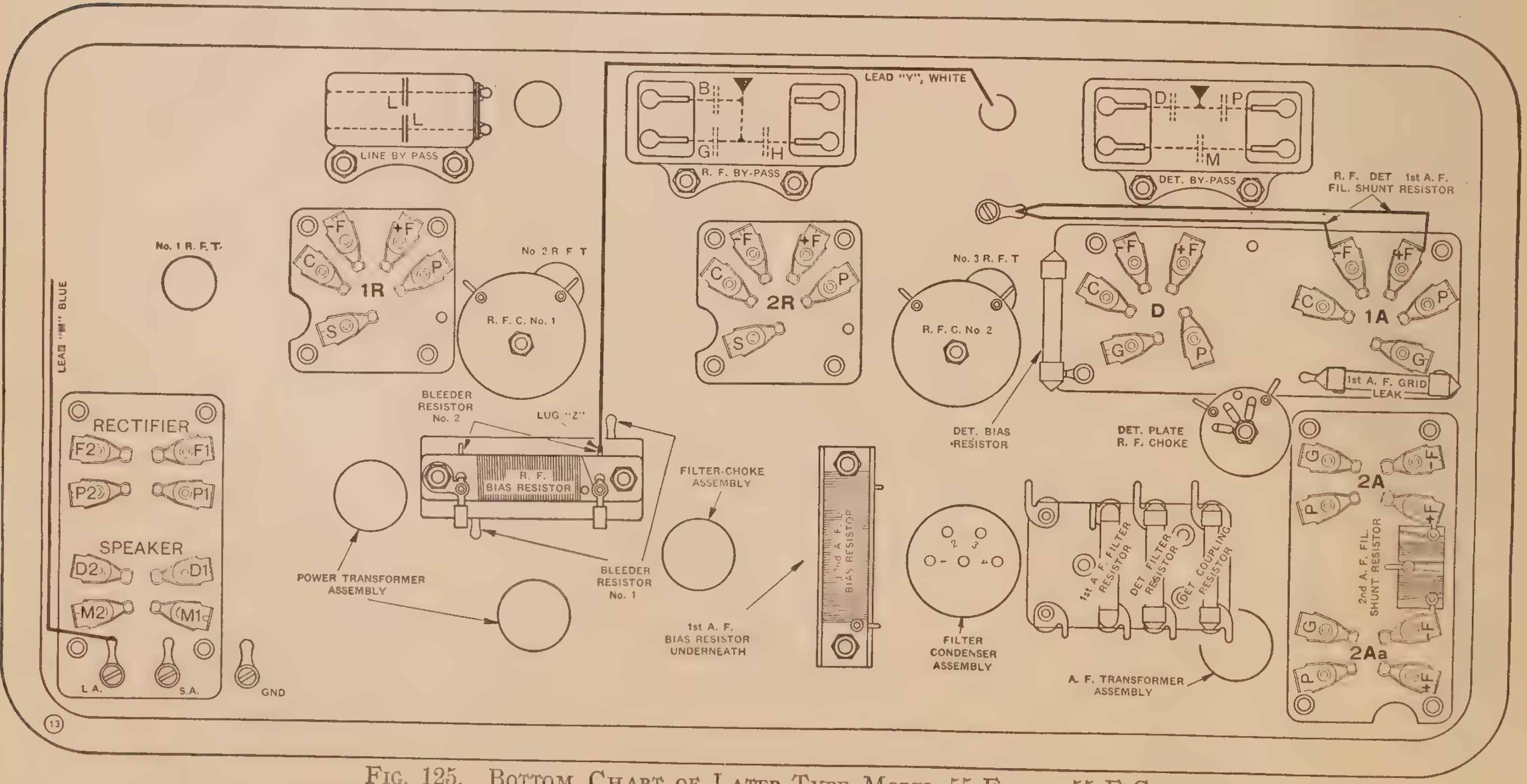

LINE BY PASS
L
L
R. F. BY-PASS
B
G
H
LEAD "Y", WHITE
DET. BY-PASS
D
P
M
R. F. DET 1st A. F. FIL. SHUNT RESISTOR
No. 1 R. F. T.
LEAD "[illegible]" BLUE
-F
+F
C
P
S
1R
No 2 R F T
R. F. C. No. 1
2R
No. 3 R. F. T
R. F. C. No 2
D
G
1A
1st A. F. GRID LEAK
RECTIFIER
F2
F1
P2
P1
SPEAKER
D2
D1
M2
M1
L A.
S.A.
GND
BLEEDER RESISTOR No. 2
LUG "Z"
R. F. BIAS RESISTOR
POWER TRANSFORMER ASSEMBLY
FILTER-CHOKE ASSEMBLY
BLEEDER RESISTOR No. 1
1st A. F. BIAS RESISTOR UNDERNEATH
2nd A. F. BIAS RESISTOR
DET. BIAS RESISTOR
DET. PLATE R. F. CHOKE
FILTER CONDENSER ASSEMBLY
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
A. F. TRANSFORMER ASSEMBLY
2A
2Aa
2nd A. F. FIL. SHUNT RESISTOR
13

FIG. 125. BOTTOM CHART OF LATER-TYPE MODEL 55-F AND 55-F-C.

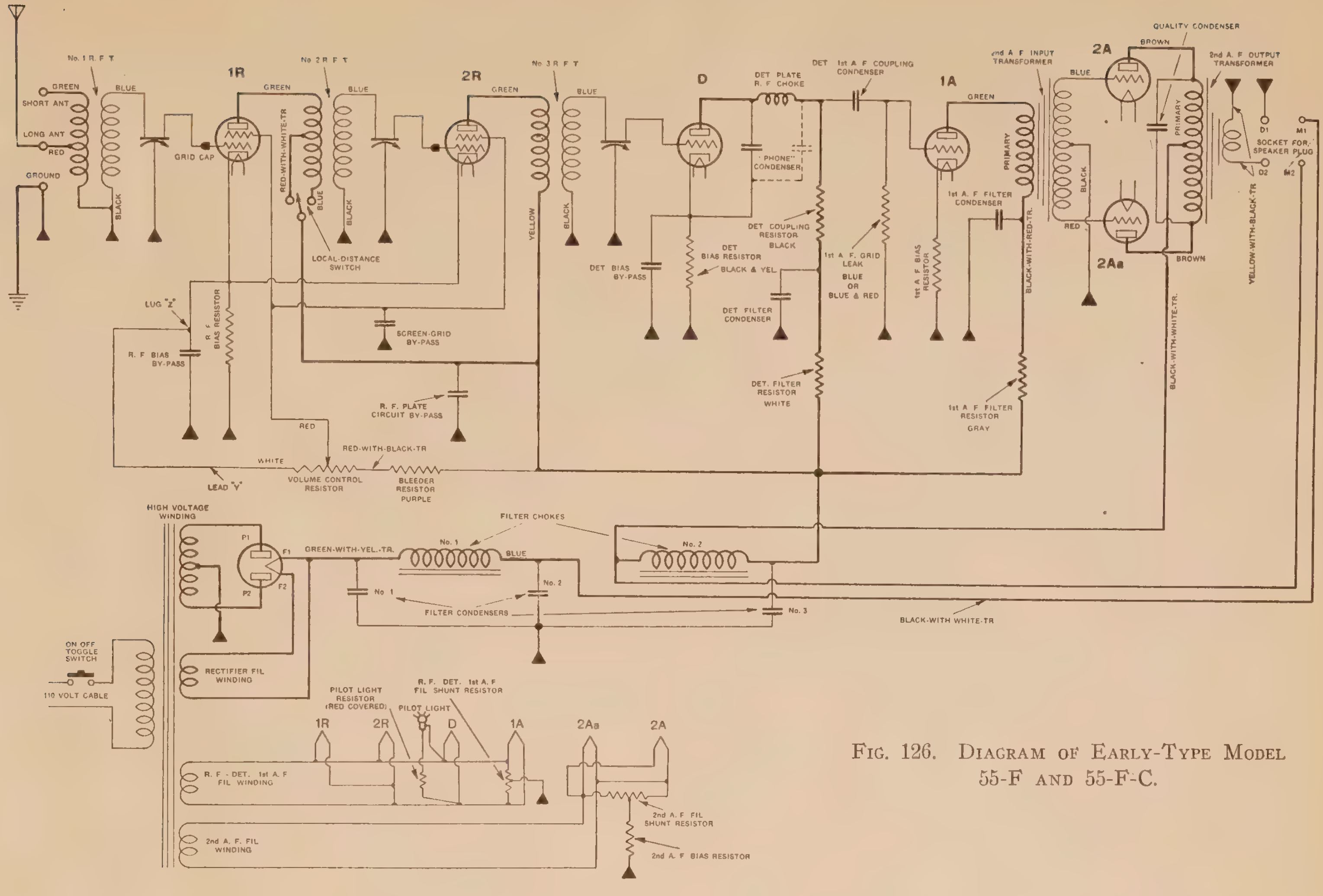

No. 1 R. F. T
GREEN
SHORT ANT
LONG ANT
RED
GROUND
BLUE
BLACK
1R
GRID CAP
GREEN
RED-WITH-WHITE-TR
No. 2 R. F. T
BLUE
BLACK
LOCAL-DISTANCE SWITCH
2R
GREEN
No. 3 R. F. T
YELLOW
BLUE
BLACK
D
DET PLATE R. F. CHOKE
"PHONE" CONDENSER
DET 1st A. F. COUPLING CONDENSER
1A
GREEN
DET COUPLING RESISTOR BLACK
DET BIAS RESISTOR
BLACK & YEL.
DET BIAS BY-PASS
DET FILTER CONDENSER
1st A. F. GRID LEAK BLUE OR BLUE & RED
1st A. F. BIAS RESISTOR
1st A. F. FILTER CONDENSER
PRIMARY
2nd A. F. INPUT TRANSFORMER
QUALITY CONDENSER
BROWN
2A
BLUE
BLACK
RED
2Aa
BROWN
PRIMARY
2nd A. F. OUTPUT TRANSFORMER
D1
D2
M1
M2
SOCKET FOR SPEAKER PLUG
YELLOW-WITH-BLACK-TR
BLACK-WITH-RED-TR.
BLACK-WITH-WHITE-TR.
LUG "Z"
R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
SCREEN-GRID BY-PASS
R. F. PLATE CIRCUIT BY-PASS
RED
RED-WITH-BLACK-TR
WHITE
LEAD "Y"
VOLUME CONTROL RESISTOR
BLEEDER RESISTOR PURPLE
DET. FILTER RESISTOR WHITE
1st A. F. FILTER RESISTOR GRAY
HIGH VOLTAGE WINDING
P1
F1
P2
F2
GREEN-WITH-YEL.-TR.
FILTER CHOKES
No. 1
BLUE
No. 2
No. 1
No. 2
FILTER CONDENSERS
No. 3
BLACK-WITH WHITE-TR
ON OFF TOGGLE SWITCH
110 VOLT CABLE
RECTIFIER FIL WINDING
PILOT LIGHT RESISTOR (RED COVERED)
PILOT LIGHT
R. F. DET. 1st A. F FIL SHUNT RESISTOR
1R
2R
D
1A
2Aa
2A
R. F. - DET. 1st A. F FIL WINDING
2nd A. F. FIL SHUNT RESISTOR
2nd A. F. FIL WINDING
2nd A. F. BIAS RESISTOR

Fig. 126. Diagram of Early-Type Model 55-F and 55-F-C.

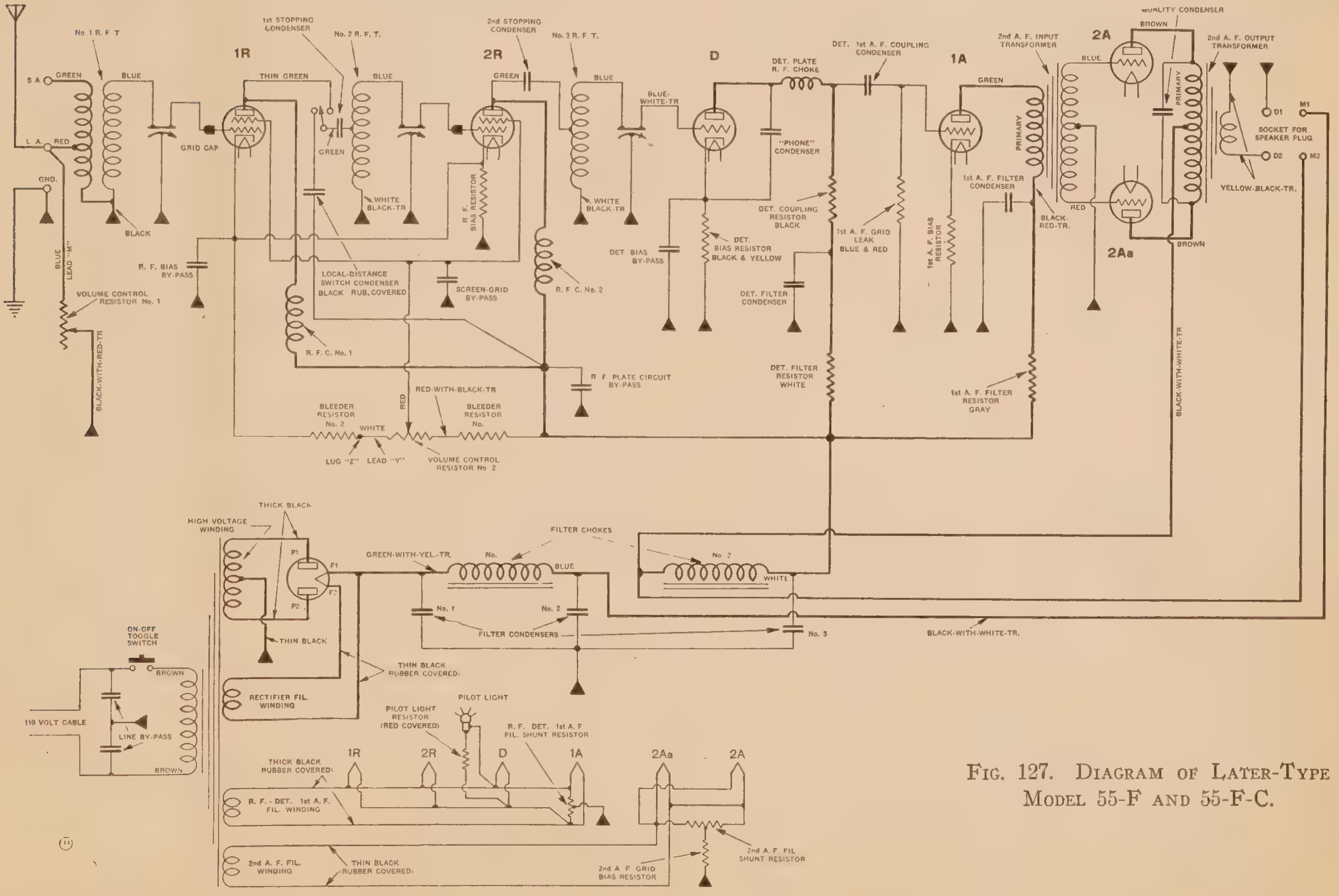

No. 1 R. F. T
S A
GREEN
BLUE
L. A.
RED
GND.
BLACK
BLUE LEAD "M"
VOLUME CONTROL RESISTOR No. 1
BLACK-WITH-RED-TR
1st STOPPING CONDENSER
No. 2 R. F. T.
1R
THIN GREEN
GRID CAP
GREEN
BLUE
WHITE BLACK-TR
2nd STOPPING CONDENSER
2R
GREEN
No. 3 R. F. T.
BLUE
R. F. BIAS RESISTOR
WHITE BLACK-TR
BLUE-WHITE-TR
D
DET. PLATE R. F. CHOKE
"PHONE" CONDENSER
DET. 1st A. F. COUPLING CONDENSER
1A
GREEN
DET. COUPLING RESISTOR BLACK
DET. BIAS RESISTOR BLACK & YELLOW
DET BIAS BY-PASS
DET. FILTER CONDENSER
1st A. F. GRID LEAK BLUE & RED
1st A. F. BIAS RESISTOR
1st A. F. FILTER CONDENSER
PRIMARY
2nd A. F. INPUT TRANSFORMER
QUALITY CONDENSER
BROWN
2A
BLUE
RED
BLACK-RED-TR.
2Aa
BROWN
PRIMARY
2nd A. F. OUTPUT TRANSFORMER
D1
D2
M1
M2
SOCKET FOR SPEAKER PLUG
YELLOW-BLACK-TR.
BLACK-WITH-WHITE-TR
R. F. BIAS BY-PASS
LOCAL-DISTANCE SWITCH CONDENSER BLACK RUB. COVERED
SCREEN-GRID BY-PASS
R. F. C. No. 2
R. F. C. No. 1
R. F. PLATE CIRCUIT BY-PASS
RED
RED-WITH-BLACK-TR
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No.
WHITE
LUG "Z"
LEAD "Y"
VOLUME CONTROL RESISTOR No. 2
DET. FILTER RESISTOR WHITE
1st A. F. FILTER RESISTOR GRAY
THICK BLACK
HIGH VOLTAGE WINDING
P1
F1
P2
F2
GREEN-WITH-YEL.-TR.
FILTER CHOKES
No.
BLUE
No. 2
WHITE
No. 1
No. 2
FILTER CONDENSERS
No. 3
BLACK-WITH-WHITE-TR.
THIN BLACK
THIN BLACK RUBBER COVERED
ON-OFF TOGGLE SWITCH
BROWN
110 VOLT CABLE
LINE BY-PASS
BROWN
RECTIFIER FIL WINDING
PILOT LIGHT
PILOT LIGHT RESISTOR (RED COVERED)
R. F. DET. 1st A. F FIL. SHUNT RESISTOR
THICK BLACK RUBBER COVERED
1R
2R
D
1A
2Aa
2A
R. F. - DET. 1st A. F. FIL. WINDING
2nd A. F. FIL SHUNT RESISTOR
2nd A. F. FIL. WINDING
THIN BLACK RUBBER COVERED
2nd A. F. GRID BIAS RESISTOR

Fig. 127. Diagram of Later-Type Model 55-F and 55-F-C.

MODEL 55-F AND 55-F-C (Early Type)
Connections of R. F. Coil Group No. 15638

No. 1 R. F. T.

Black (1″) to chassis.
Blue to stator No. 1 V. C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

Black (1″) to chassis.
Blue to stator No. 2 V. C.
Green to P1R.
Blue, and red-white to corresponding leads from local-distance switch.

No. 3 R. F. T.

Black (1″) to chassis.
Blue (with lug) to stator No. 3 V. C.
Blue-white to GD.
Green to P2R.
Yellow to by-pass H.

Condensers in Left-Hand By-Pass

B—R. F. bias by-pass.
G—Screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in Right-Hand By-Pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.
P—"Phone" condenser.

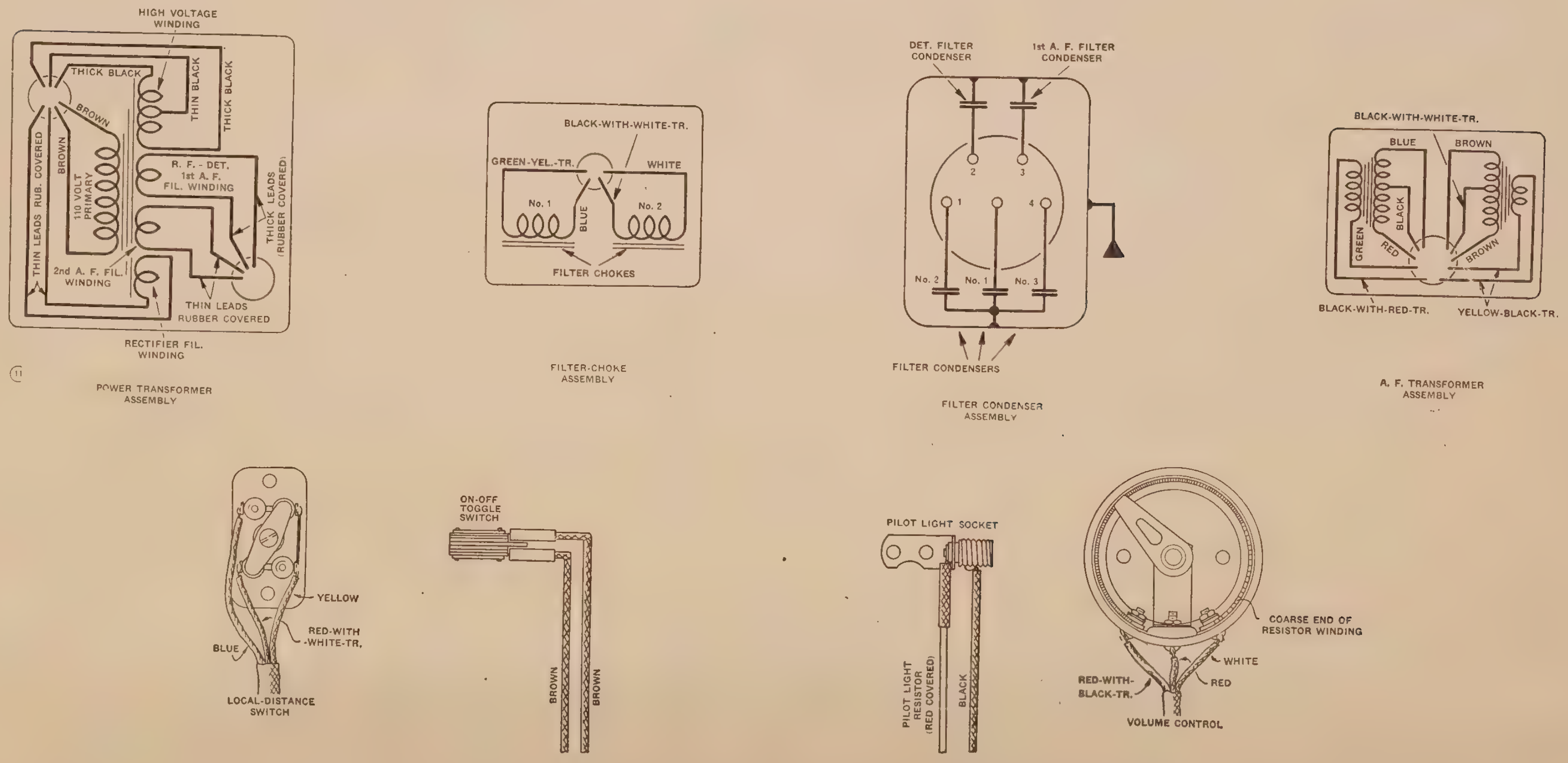

HIGH VOLTAGE WINDING
THICK BLACK
THIN BLACK
THICK BLACK
BROWN
BROWN
110 VOLT PRIMARY
THIN LEADS RUB. COVERED
R. F. - DET. 1st A. F. FIL. WINDING
THICK LEADS (RUBBER COVERED)
2nd A. F. FIL. WINDING
THIN LEADS RUBBER COVERED
RECTIFIER FIL. WINDING
POWER TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
WHITE
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
DET. FILTER CONDENSER
1st A. F. FILTER CONDENSER
2
3
1
4
No. 2
No. 1
No. 3
FILTER CONDENSERS
FILTER CONDENSER ASSEMBLY
BLACK-WITH-WHITE-TR.
BLUE
BROWN
GREEN
BLACK
RED
BROWN
BLACK-WITH-RED-TR.
YELLOW-BLACK-TR.
A. F. TRANSFORMER ASSEMBLY
YELLOW
RED-WITH -WHITE-TR.
BLUE
LOCAL-DISTANCE SWITCH
ON-OFF TOGGLE SWITCH
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED)
BLACK
COARSE END OF RESISTOR WINDING
WHITE
RED
RED-WITH-BLACK-TR.
VOLUME CONTROL

Fig. 128. Connections of Units in Early-Type Model 55-F and 55-F-C.

MODEL 55-F AND 55-F-C (Early Type)

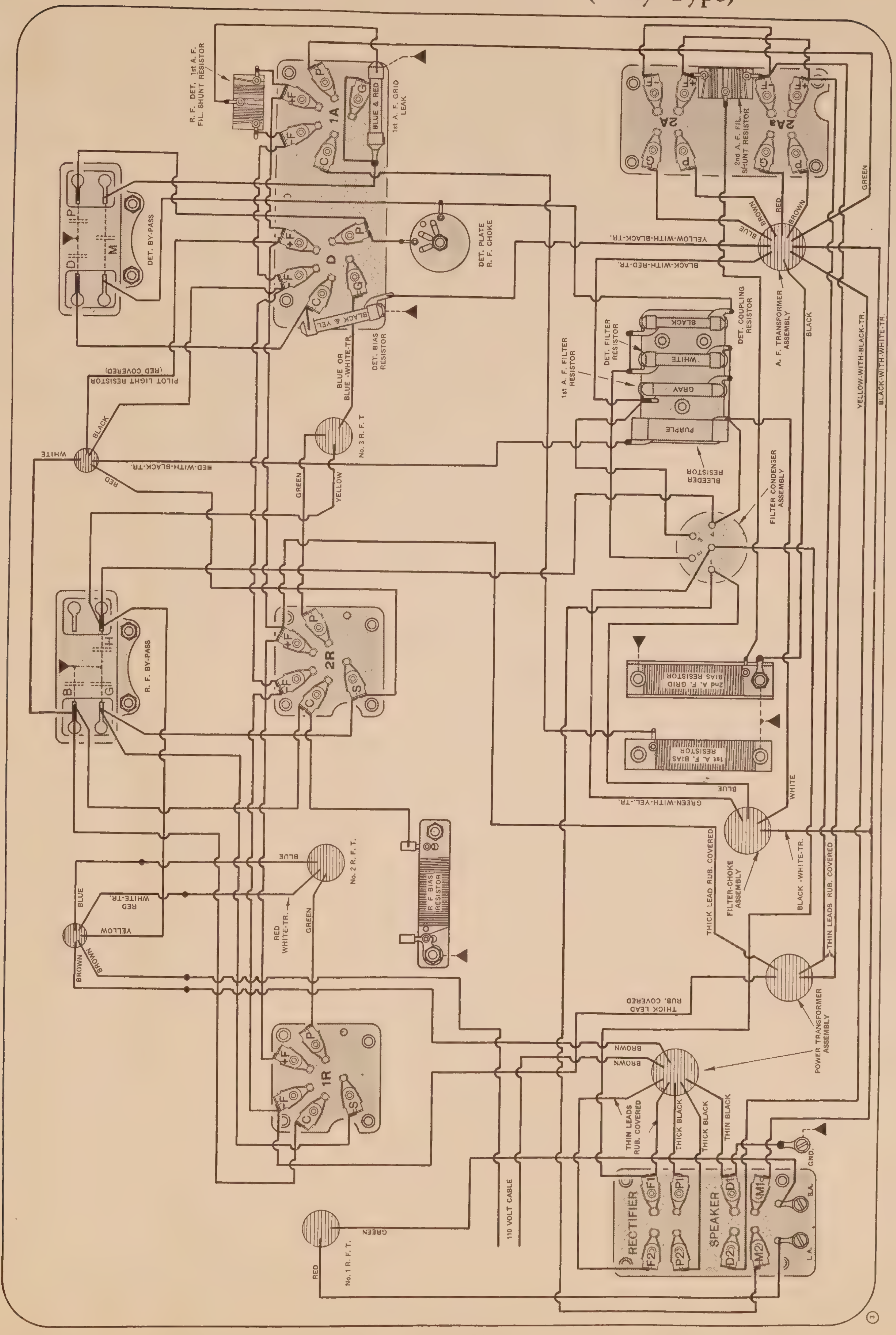

R. F. DET. 1st A. F. FIL. SHUNT RESISTOR
1A
BLUE & RED
1st A. F. GRID LEAK
2A
2Aa
2nd A. F. FIL. SHUNT RESISTOR
DET. BY-PASS
D
DET. PLATE R. F. CHOKE
BLACK & YEL.
DET. BIAS RESISTOR
BLUE OR BLUE-WHITE-TR.
YELLOW-WITH-BLACK-TR.
BLACK-WITH-RED-TR.
BROWN
RED
BLUE
GREEN
A. F. TRANSFORMER ASSEMBLY
BLACK
DET. COUPLING RESISTOR
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
WHITE
GRAY
PURPLE
BLEEDER RESISTOR
YELLOW-WITH-BLACK-TR.
BLACK-WITH-WHITE-TR.
PILOT LIGHT RESISTOR (RED COVERED)
WHITE
RED-WITH-BLACK-TR.
No. 3 R. F. T
YELLOW
FILTER CONDENSER ASSEMBLY
R. F. BY-PASS
2R
2nd A. F. GRID BIAS RESISTOR
1st A. F. BIAS RESISTOR
GREEN-WITH-YEL.-TR.
THICK LEAD RUB. COVERED
FILTER-CHOKE ASSEMBLY
BLACK-WHITE-TR.
THIN LEADS RUB. COVERED
No. 2 R. F. T.
RED WHITE-TR.
R. F. BIAS RESISTOR
POWER TRANSFORMER ASSEMBLY
1R
THICK BLACK
THIN BLACK
RECTIFIER
SPEAKER
GND.
S.A.
L.A.
110 VOLT CABLE
No. 1 R. F. T.

FIG. 129. BOTTOM WIRING OF EARLY-TYPE MODEL 55-F AND 55-F-C.

This drawing shows the later-type R. F. bias resistor. See Page 107 for connections of double-type phone condenser. Some of these sets had a combination resistor, No. 15274, which is superseded by two separate resistors, No. 16988 being used as R. F. bias resistor, and No. 17077 as filament shunt resistor.

MODEL 55-F AND 55-F-C (Later Type)

Connections of R. F. Coil Group No. 16990

The colors of the leads to chassis and to the variable condensers are in some cases different from those specified below.

No. 1 R. F. T.

Black (1″) to chassis.
Blue-white-tr. (5″) to stator No. 1 V.C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

White-black-tr. (1″) to chassis.
Blue-white-tr. to stator No. 2 V.C.
Green to green lead from local-distance switch.

No. 3 R. F. T.

White-black-tr. (1″) to chassis.
Blue (with lug) to stator No. 3 V.C.
Blue-white-tracer to GD.
Green to P2R.

Condensers in Line By-pass

L—Line by-pass.
L—Line by-pass.

Condensers in R. F. By-pass

B—R. F. bias by-pass.
G—Screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in Detector By-pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.
P—"Phone" condenser.

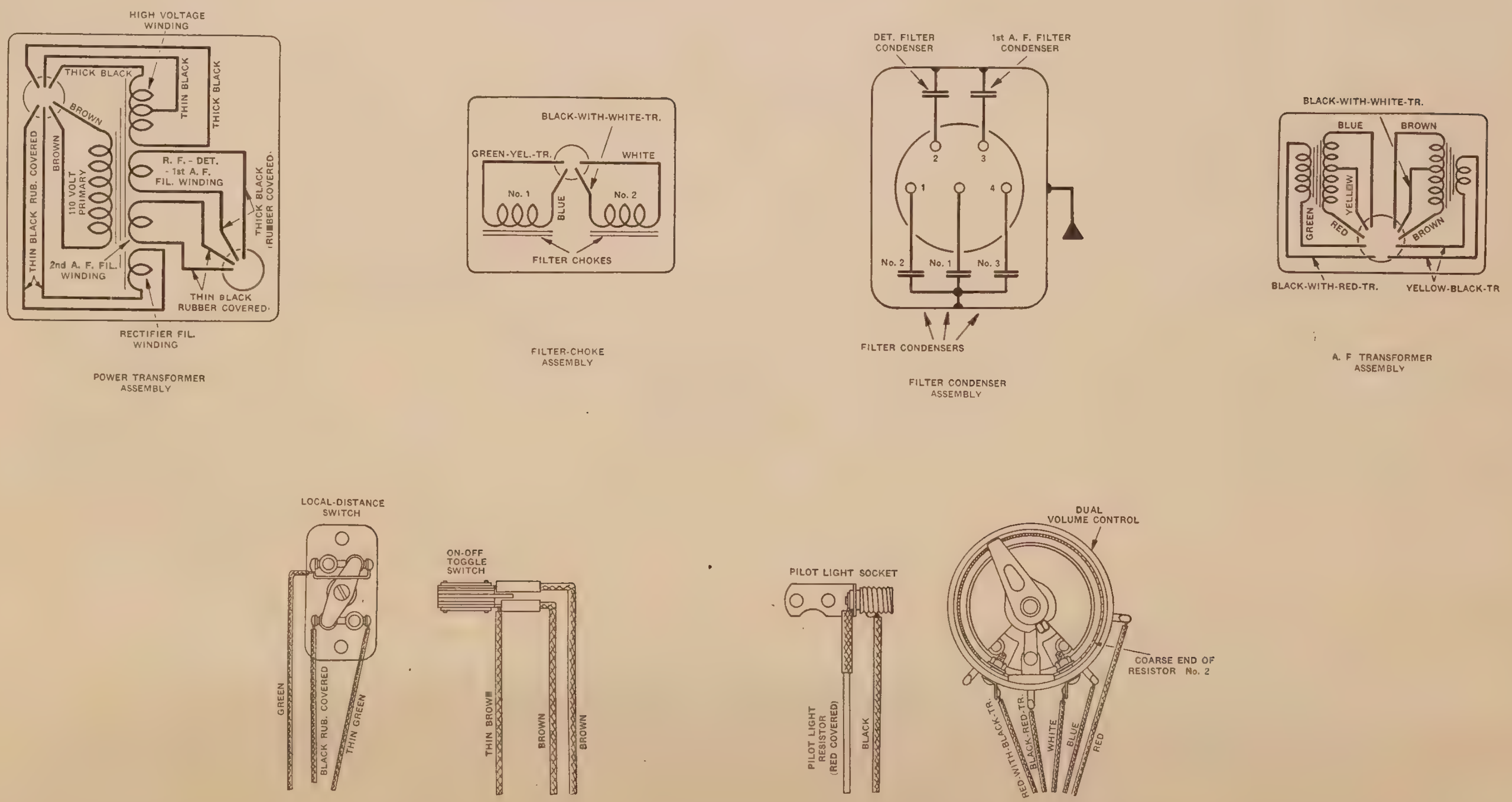

HIGH VOLTAGE WINDING
THICK BLACK
THIN BLACK
THICK BLACK
BROWN
BROWN
THIN BLACK RUB. COVERED
110 VOLT PRIMARY
R. F. - DET. - 1st A. F. FIL. WINDING
THICK BLACK RUBBER COVERED
2nd A. F. FIL. WINDING
THIN BLACK RUBBER COVERED
RECTIFIER FIL. WINDING
POWER TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
WHITE
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
DET. FILTER CONDENSER
1st A. F. FILTER CONDENSER
2
3
1
4
No. 2
No. 1
No. 3
FILTER CONDENSERS
FILTER CONDENSER ASSEMBLY
BLACK-WITH-WHITE-TR.
BLUE
BROWN
GREEN
YELLOW
RED
BROWN
BLACK-WITH-RED-TR.
YELLOW-BLACK-TR
A. F TRANSFORMER ASSEMBLY
LOCAL-DISTANCE SWITCH
GREEN
BLACK RUB. COVERED
THIN GREEN
ON-OFF TOGGLE SWITCH
THIN BROWN
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED)
BLACK
DUAL VOLUME CONTROL
COARSE END OF RESISTOR No. 2
RED-WITH-BLACK-TR.
BLACK-RED-TR.
WHITE
BLUE
RED

FIG. 130. CONNECTIONS OF UNITS IN LATER-TYPE MODEL 55-F AND 55-F-C.
The center-tap of the input A. F. transformer is sometimes black-with-yellow-paint. A "quality" condenser, not shown above, is connected across the primary (large winding) of the 2nd-A. F. output transformer.

MODEL 55-F AND 55-F-C (Later Type)

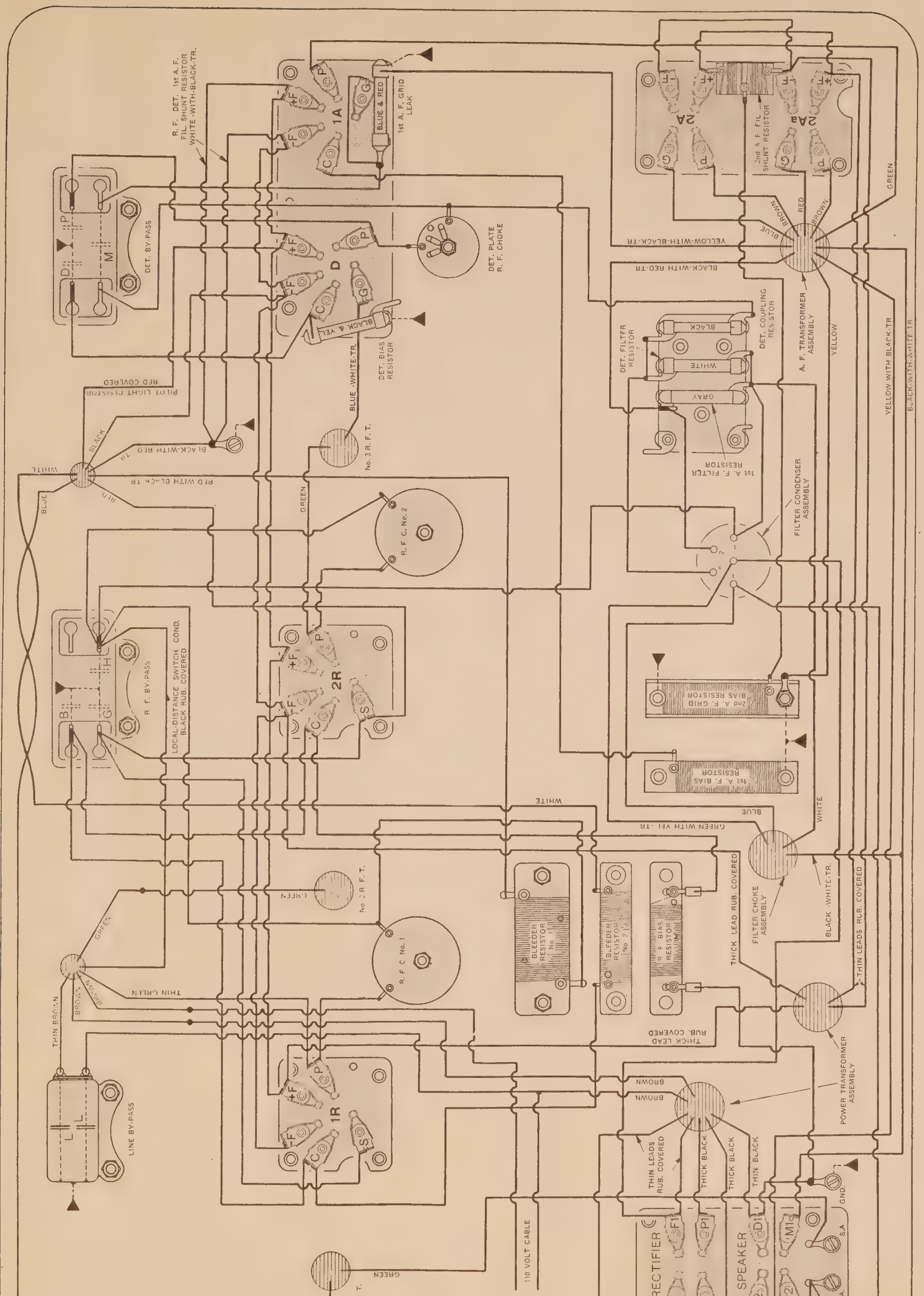

1A
D
2R
1R
2A
2Aa
+F
-F
P
G
C
S
BLUE & RED
1st A. F. GRID LEAK
BLACK & YEL
DET. BIAS RESISTOR
DET. PLATE R. F. CHOKE
DET. BY-PASS
R. F. DET. 1st A. F. FIL. SHUNT RESISTOR WHITE-WITH-BLACK-TR.
2nd A. F. FIL. SHUNT RESISTOR
BLUE-WHITE-TR.
PILOT LIGHT RESISTOR RED COVERED
BLACK-WITH RED TR
RED WITH BLACK TR
WHITE
BLACK
BLUE
RED
GREEN
BROWN
No. 3 R. F. T.
R. F. C. No. 2
R. F. C. No. 1
No. 2 R. F. T.
No. 1 R. F. T.
R. F. BY-PASS
LOCAL-DISTANCE SWITCH COND. BLACK RUB. COVERED
LINE BY-PASS
THIN BROWN
THIN GREEN
YELLOW-WITH-BLACK-TR
BLACK-WITH RED-TR
A. F. TRANSFORMER ASSEMBLY
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
BLACK
WHITE
GRAY
1st A. F. FILTER RESISTOR
FILTER CONDENSER ASSEMBLY
YELLOW
YELLOW WITH BLACK TR
BLACK-WITH-WHITE TR
2nd A. F. GRID BIAS RESISTOR
1st A. F. BIAS RESISTOR
GREEN WITH YEL.-TR.
BLACK-WHITE-TR.
FILTER CHOKE ASSEMBLY
THICK LEAD RUB. COVERED
THIN LEADS RUB. COVERED
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 2
R. F. BIAS RESISTOR
POWER TRANSFORMER ASSEMBLY
THIN LEADS RUB. COVERED
THICK BLACK
THIN BLACK
110 VOLT CABLE
RECTIFIER
F1
F2
P1
P2
SPEAKER
D1
D2
M1
M2
GND.
S.A.
L.A.

FIG. 131. BOTTOM WIRING OF LATER-TYPE MODEL 55-F AND 55-F-C.

The 1st-A. F. bias resistor is mounted under the 2nd-A. F. bias resistor. The three other wire-wound resistors are mounted together, being insulated from each other by sheets of fibre.

Some of these sets had a combination resistor, No. 16868, which is superseded by two separate resistors, No. 16988 being used as R. F. bias, and No. 16989 as bleeder No. 2.

MODEL 60 AND 60-C

Use High Resistance D. C. Voltmeter (About 0-50-250) To Measure Plate and Grid Voltages. Use A. C. Voltmeter To Measure Filament Voltages.

	MEASURE ACROSS	APPROX. VOLTAGE		NO READING INDICATES ‡
		110 V. Line	120 V. Line	
FILAMENT VOLTAGES	—F to +F Contacts on each Receiving Tube Socket.	2.2	2.4	Open filament winding or connection.
	F1 to F2 on Rectifier Tube Socket.	4.5	4.9	
PLATE VOLTAGES	C1R to P1R.	156	170	Open high voltage winding, open speaker magnet coil, open filter choke, open primary No. 2 R.F.T.,†† open R.F. bias resistor, or open 1st-R.F. bias resistor.
	C2R to P2R.	160	175	Open primary No. 3 R.F.T.††
	C3R to P3R.	160	175	Open primary No. 4 R.F.T.††
	CD to PD.	101	110	Open detector filter resistor, coupling resistor, R.F. choke, or det. bias resistor.†
	C1A to P1A.	69	75	Open 1st-A.F. filter resistor, primary of A.F. input transformer, or 1st-A.F. bias.
	—F2A to P2A.	230	250	Open primary of output transformer.
	—F2Aa to P2Aa.	230	250	
GRID VOLTAGES	C1R to G1R.	7.3	8	Open secondary No. 1 R.F.T.
	C2R to G2R.	3.7	4	Open secondary No. 2 R.F.T.
	C3R to G3R.	3.7	4	Open secondary No. 3 R.F.T.
	CD to GD.	11	12	Open secondary No. 4 R.F.T.
	C1A to G1A.*	1.8	2	Open 1st-A.F. grid leak.
	—F2A to G2A.	44	48	Open 2nd-A.F. bias resistor No. 2 or secondary of input A.F. transformer.**
	—F2Aa to G2Aa.	44	48	
SCREEN VOLTAGES	C1R to S1R.	119	130	Open connection to slider of volume control, open volume-control resistor, or open bleeder resistor.‡‡
	C2R to S2R.	83	96	
	C3R to S3R.	83	96	

* This is the measured voltage, not the actual operating voltage.

** If 2nd-A. F. bias resistor No. 1 is open, the grid voltage will be approximately 85.

† The detector plate voltage will be low, and the detector grid voltage high, if the "phone" condenser is shorted.

†† In later Model 60 and 60-C, the primaries of No. 2, 3 and 4 R. F. T. are replaced by R. F. choke coils mounted under the chassis.

‡ Low plate, screen, or grid voltages may indicate a partially shorted by-pass or filter condenser.

‡‡ In early Model 60 and 60-C, incorrect voltage on 1st-R. F. screen may be used by defective screen-grid resistor No. 1 or 2.

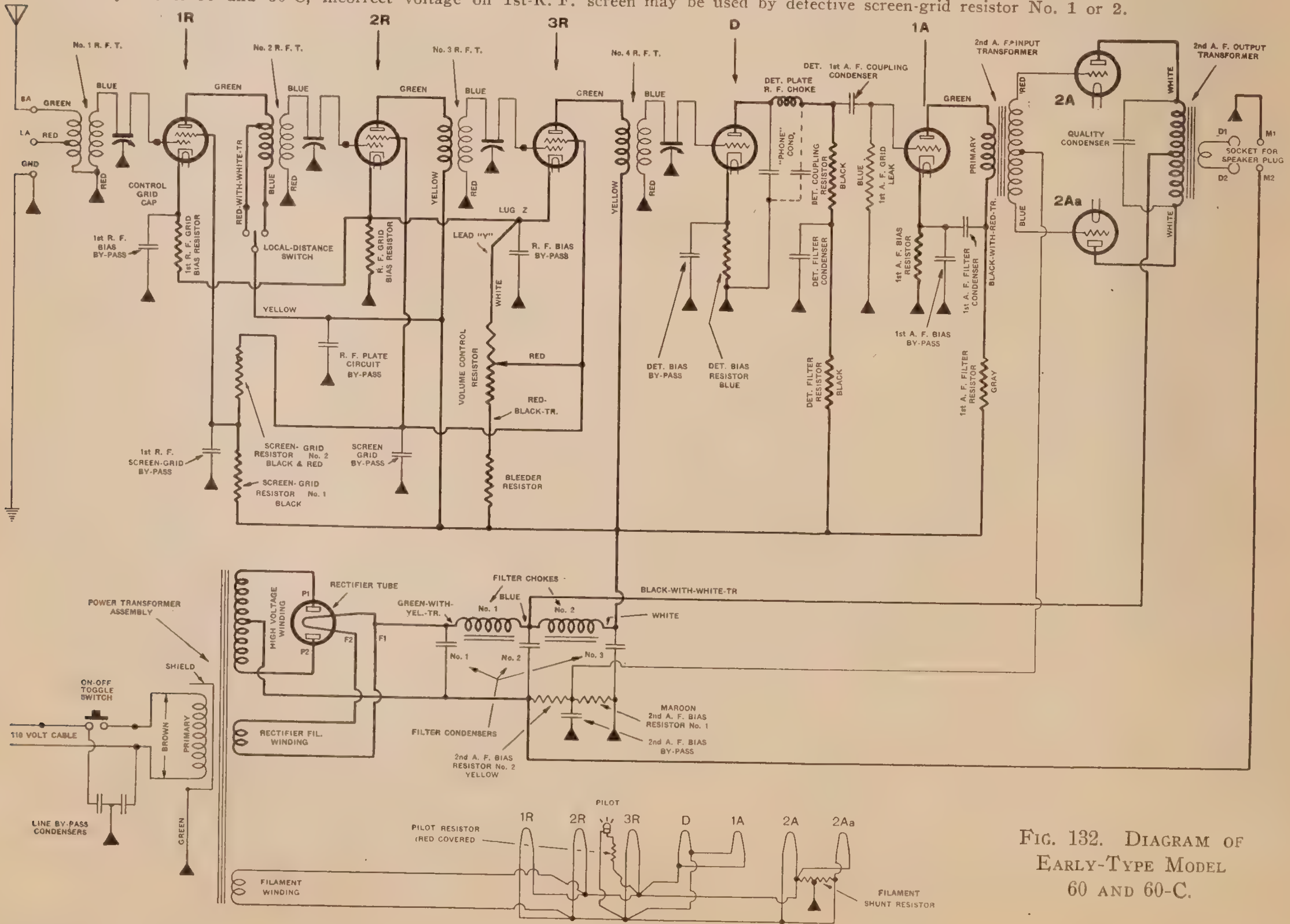

1R
2R
3R
D
1A
No. 1 R. F. T.
No. 2 R. F. T.
No. 3 R. F. T.
No. 4 R. F. T.
BA
LA
GND
GREEN
RED
BLUE
CONTROL GRID CAP
1st R. F. BIAS BY-PASS
1st R. F. GRID BIAS RESISTOR
RED-WITH-WHITE-TR
LOCAL-DISTANCE SWITCH
R. F. GRID BIAS RESISTOR
YELLOW
LUG Z
LEAD "Y"
R. F. BIAS BY-PASS
WHITE
R. F. PLATE CIRCUIT BY-PASS
VOLUME CONTROL RESISTOR
RED-BLACK-TR.
1st R. F. SCREEN-GRID BY-PASS
SCREEN-GRID RESISTOR No. 2 BLACK & RED
SCREEN GRID BY-PASS
SCREEN-GRID RESISTOR No. 1 BLACK
BLEEDER RESISTOR
DET. PLATE R. F. CHOKE
DET. 1st A. F. COUPLING CONDENSER
"PHONE" COND.
DET. COUPLING RESISTOR
BLACK
1st A. F. GRID LEAK
DET. BIAS BY-PASS
DET. BIAS RESISTOR BLUE
DET. FILTER CONDENSER
DET. FILTER RESISTOR
1st A. F. BIAS RESISTOR
1st A. F. BIAS BY-PASS
1st A. F. FILTER CONDENSER
1st A. F. FILTER RESISTOR
GRAY
PRIMARY
BLACK-WITH-RED-TR.
2nd A. F. INPUT TRANSFORMER
2nd A. F. OUTPUT TRANSFORMER
2A
2Aa
QUALITY CONDENSER
D1
D2
M1
M2
SOCKET FOR SPEAKER PLUG
POWER TRANSFORMER ASSEMBLY
HIGH VOLTAGE WINDING
RECTIFIER TUBE
P1
P2
F1
F2
FILTER CHOKES
GREEN-WITH-YEL.-TR.
No. 1
No. 2
No. 3
BLACK-WITH-WHITE-TR
FILTER CONDENSERS
MAROON 2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS BY-PASS
2nd A. F. BIAS RESISTOR No. 2 YELLOW
SHIELD
ON-OFF TOGGLE SWITCH
110 VOLT CABLE
BROWN
RECTIFIER FIL. WINDING
LINE BY-PASS CONDENSERS
PILOT
PILOT RESISTOR (RED COVERED
FILAMENT WINDING
FILAMENT SHUNT RESISTOR

Fig. 132. Diagram of Early-Type Model 60 and 60-C.

MODEL 60 AND 60-C

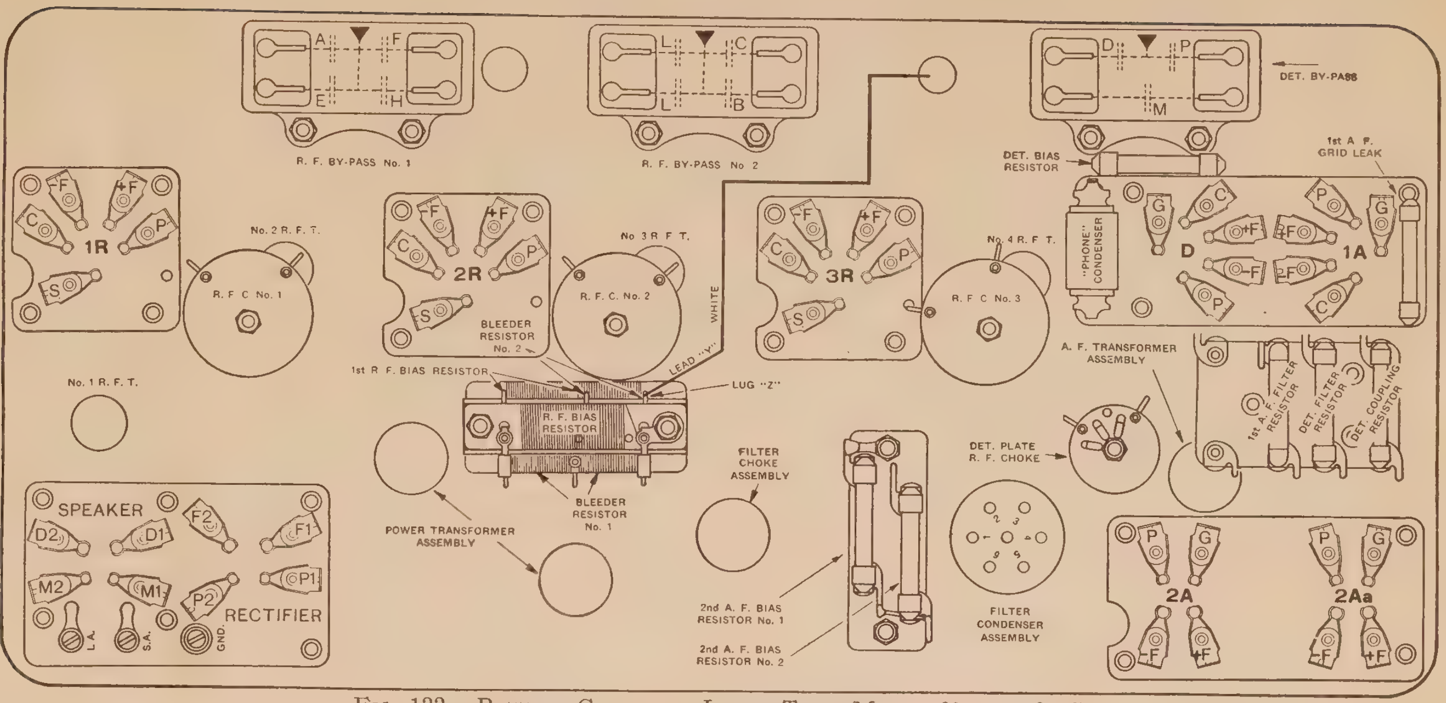

R. F. BY-PASS No. 1
R. F. BY-PASS No. 2
DET. BY-PASS
DET. BIAS RESISTOR
1st A. F. GRID LEAK
"PHONE" CONDENSER
1R
2R
3R
D
1A
No. 2 R. F. T.
No. 3 R. F. T.
No. 4 R. F. T.
No. 1 R. F. T.
R. F. C. No. 1
R. F. C. No. 2
R. F. C. No. 3
BLEEDER RESISTOR No. 2
1st R. F. BIAS RESISTOR
R. F. BIAS RESISTOR
LEAD "Y"
LUG "Z"
WHITE
BLEEDER RESISTOR No. 1
POWER TRANSFORMER ASSEMBLY
FILTER CHOKE ASSEMBLY
A. F. TRANSFORMER ASSEMBLY
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
DET. PLATE R. F. CHOKE
SPEAKER
RECTIFIER
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS RESISTOR No. 2
FILTER CONDENSER ASSEMBLY
2A
2Aa

FIG. 133. BOTTOM CHART OF LATER-TYPE MODEL 60 AND 60-C.

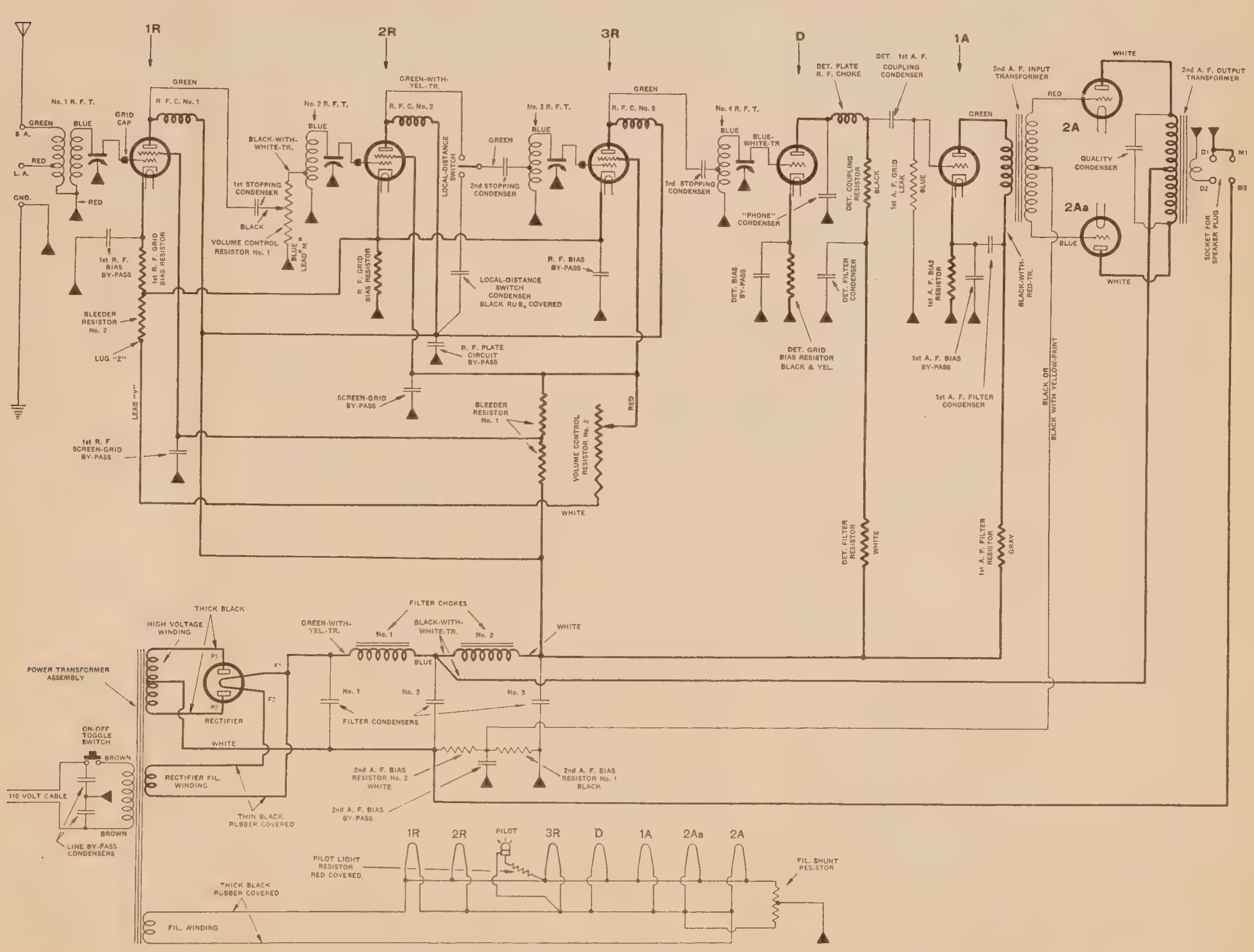

1R
2R
3R
D
1A
No. 1 R. F. T.
No. 2 R. F. T.
No. 3 R. F. T.
No. 4 R. F. T.
R. F. C. No. 1
R. F. C. No. 2
R. F. C. No. 3
GRID CAP
1st STOPPING CONDENSER
2nd STOPPING CONDENSER
3rd STOPPING CONDENSER
VOLUME CONTROL RESISTOR No. 1
LOCAL-DISTANCE SWITCH
LOCAL-DISTANCE SWITCH CONDENSER BLACK RUB. COVERED
R. F. BIAS BY-PASS
R. F. PLATE CIRCUIT BY-PASS
SCREEN-GRID BY-PASS
1st R. F. BIAS BY-PASS
1st R. F. GRID BIAS RESISTOR
R. F. GRID BIAS RESISTOR
BLEEDER RESISTOR No. 2
LUG "Z"
LEAD "Y"
1st R. F. SCREEN-GRID BY-PASS
BLEEDER RESISTOR No. 1
VOLUME CONTROL RESISTOR No. 2
DET. PLATE R. F. CHOKE
DET. 1st A. F. COUPLING CONDENSER
"PHONE" CONDENSER
DET. BIAS BY-PASS
DET. GRID BIAS RESISTOR BLACK & YEL.
DET. FILTER CONDENSER
DET. COUPLING RESISTOR
1st A. F. GRID LEAK
1st A. F. BIAS RESISTOR
1st A. F. BIAS BY-PASS
1st A. F. FILTER CONDENSER
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
2nd A. F. INPUT TRANSFORMER
2nd A. F. OUTPUT TRANSFORMER
QUALITY CONDENSER
SOCKET FOR SPEAKER PLUG
2A
2Aa
S. A.
L. A.
GND.
GREEN
BLUE
RED
BLACK
WHITE
GRAY
GREEN-WITH-YEL.-TR.
BLACK-WITH-WHITE-TR.
BLUE-WHITE-TR.
BLACK-WITH-RED-TR.
BLACK OR BLACK WITH YELLOW-PAINT
THICK BLACK
HIGH VOLTAGE WINDING
POWER TRANSFORMER ASSEMBLY
RECTIFIER
FILTER CHOKES
No. 1
No. 2
No. 3
FILTER CONDENSERS
ON-OFF TOGGLE SWITCH
BROWN
110 VOLT CABLE
RECTIFIER FIL. WINDING
THIN BLACK RUBBER COVERED
LINE BY-PASS CONDENSERS
2nd A. F. BIAS RESISTOR No. 2 WHITE
2nd A. F. BIAS RESISTOR No. 1 BLACK
2nd A. F. BIAS BY-PASS
PILOT
PILOT LIGHT RESISTOR RED COVERED
FIL. SHUNT RESISTOR
THICK BLACK RUBBER COVERED
FIL. WINDING

FIG. 134. CIRCUIT OF LATER MODEL 60 AND 60-C.
The changes shown above were made gradually, not all at one time.

MODEL 60 AND 60-C (Early Type)
Connections of R. F. Coil Group No. 16363

No. 1 R. F. T.

Red (1″) to chassis.
Blue to stator No. 1 V. C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

Red to chassis.
Blue (with lug) to stator No. 2 V. C.
Green to P1R.
Blue, and red-white to leads of corresponding color from local-distance switch.

No. 3 R. F. T.

Red to chassis.
Blue to stator No. 3 V. C.
Green to P2R.
Yellow to by-pass H.

No. 4 R. F. T.

Red to chassis.
Blue to stator No. 4 V. C.
Blue to GD.
Green to P3R.
Yellow to contact No. 6 on filter condenser.

Condensers in R. F. By-Pass No. 1

A—1st-R. F. bias by-pass.
E—1st-R. F. screen by-pass.
F—2nd-3rd-R. F. screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in R. F. By-Pass No. 2

B—R. F. bias by-pass.
C—2nd-A. F. bias by-pass.
L—Line by-pass.
L—Line by-pass.

Condensers in Detector By-Pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.

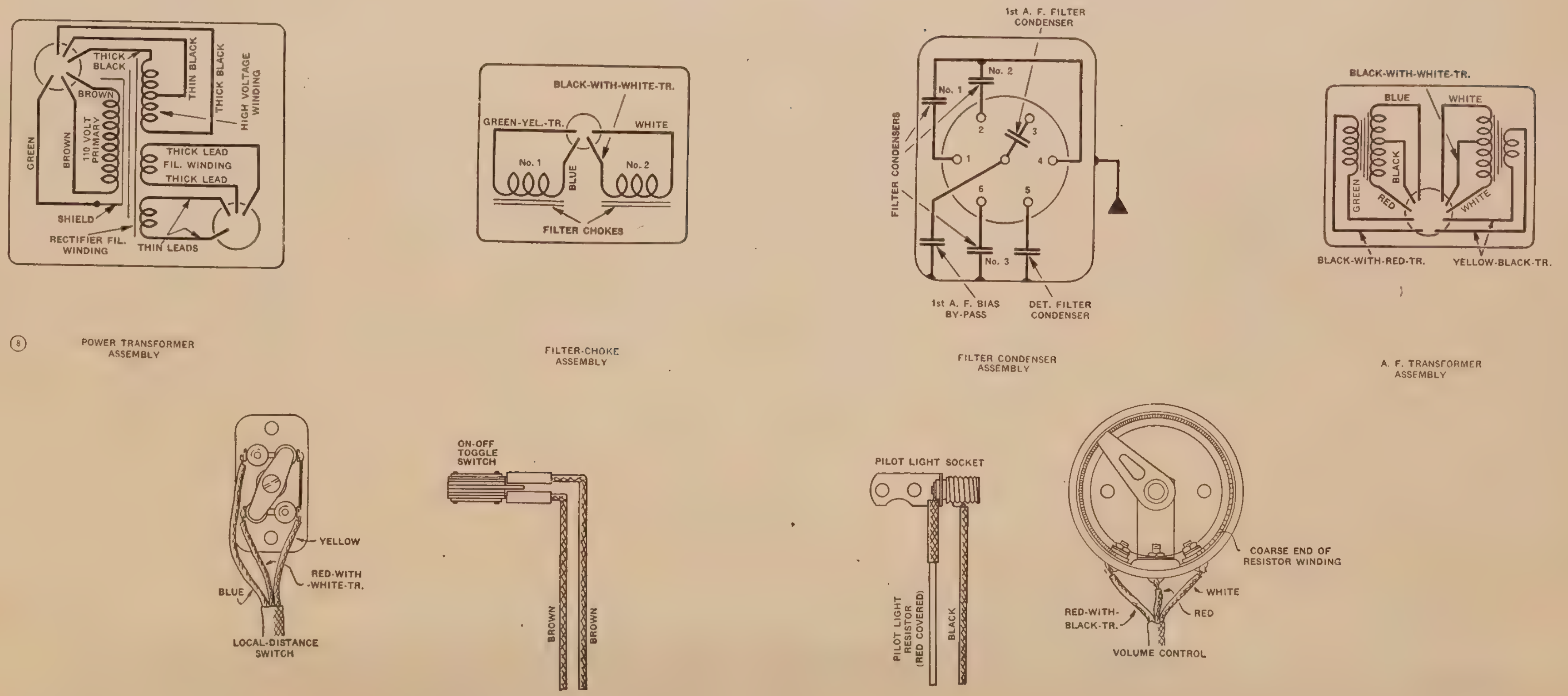

THICK BLACK
BROWN
GREEN
BROWN
110 VOLT PRIMARY
THIN BLACK
THICK BLACK
HIGH VOLTAGE WINDING
THICK LEAD
FIL. WINDING
THICK LEAD
SHIELD
RECTIFIER FIL. WINDING
THIN LEADS
⑧
POWER TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
WHITE
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
1st A. F. FILTER CONDENSER
No. 1
No. 2
FILTER CONDENSERS
1
2
3
4
5
6
No. 3
1st A. F. BIAS BY-PASS
DET. FILTER CONDENSER
FILTER CONDENSER ASSEMBLY
BLACK-WITH-WHITE-TR.
BLUE
WHITE
GREEN
BLACK
RED
WHITE
BLACK-WITH-RED-TR.
YELLOW-BLACK-TR.
A. F. TRANSFORMER ASSEMBLY
YELLOW
RED-WITH-WHITE-TR.
BLUE
LOCAL-DISTANCE SWITCH
ON-OFF TOGGLE SWITCH
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED)
BLACK
COARSE END OF RESISTOR WINDING
WHITE
RED
RED-WITH-BLACK-TR.
VOLUME CONTROL

Fig. 135. Connections of Units in Early-Type Model 60 and 60-C.

MODEL 60 AND 60-C (Early Type)

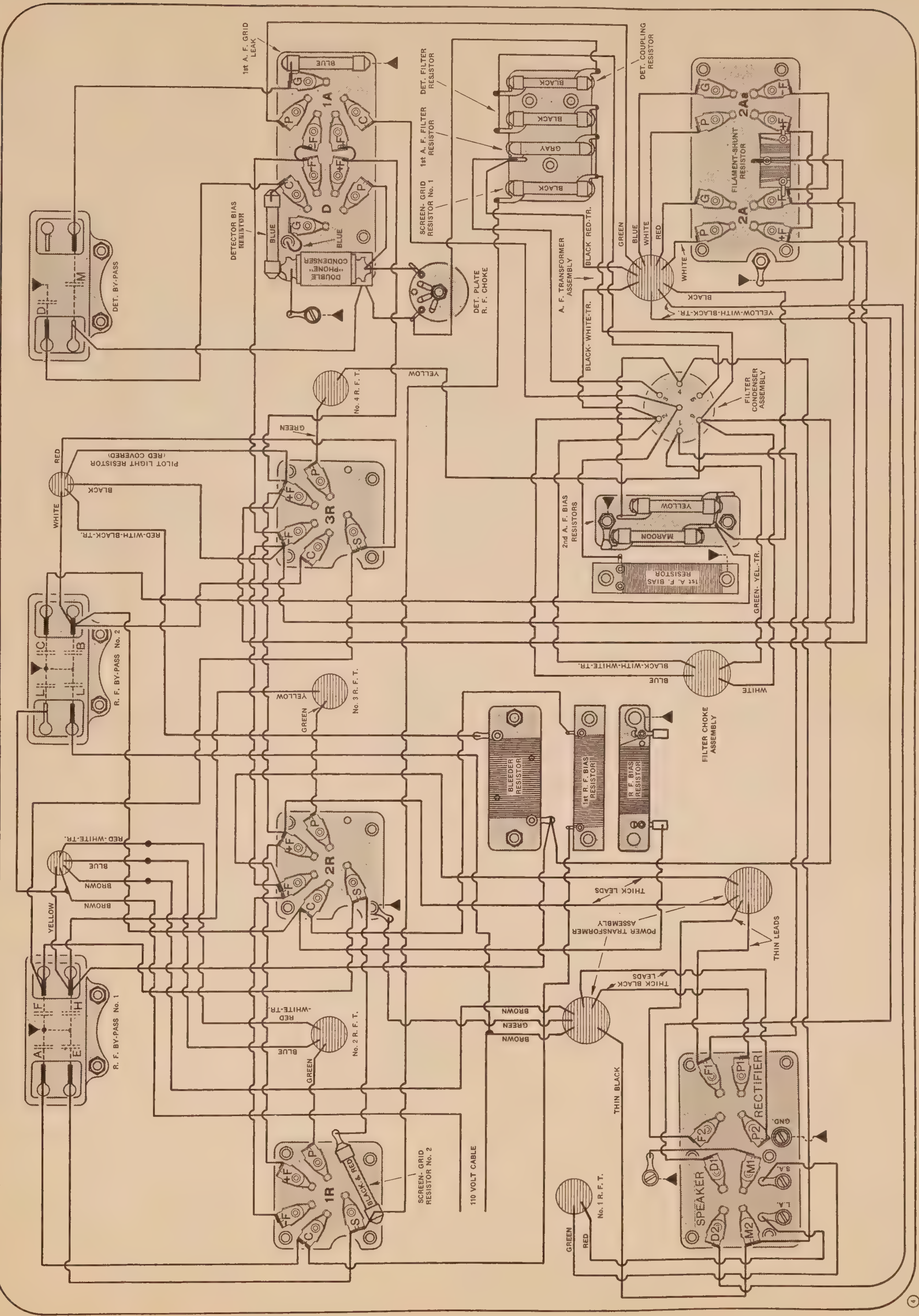

1st A. F. GRID LEAK
BLUE
1A
G
P
C
-F
+F
D
DETECTOR BIAS RESISTOR
DOUBLE "PHONE" CONDENSER
DET. BY-PASS
M
DET. PLATE R. F. CHOKE
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
SCREEN-GRID RESISTOR No. 1
BLACK
GRAY
DET. COUPLING RESISTOR
2A
FILAMENT-SHUNT RESISTOR
GREEN
WHITE
RED
A. F. TRANSFORMER ASSEMBLY
BLACK-RED-TR.
BLACK-WHITE-TR.
YELLOW-WITH-BLACK-TR.
FILTER CONDENSER ASSEMBLY
No. 4 R. F. T.
YELLOW
PILOT LIGHT RESISTOR (RED COVERED)
RED-WITH-BLACK-TR.
3R
S
2nd A. F. BIAS RESISTORS
MAROON
1st A. F. BIAS RESISTOR
GREEN-YEL.-TR.
BLACK-WITH-WHITE-TR.
R. F. BY-PASS No. 2
B
L
No. 3 R. F. T.
FILTER CHOKE ASSEMBLY
BLEEDER RESISTOR
1st R. F. BIAS RESISTOR
R. F. BIAS RESISTOR
RED-WHITE-TR.
BROWN
2R
THICK LEADS
POWER TRANSFORMER ASSEMBLY
THIN LEADS
THICK BLACK LEADS
R. F. BY-PASS No. 1
F
H
A
E
No. 2 R. F. T.
THIN BLACK
1R
BLACK & RED
SCREEN-GRID RESISTOR No. 2
110 VOLT CABLE
No. 1 R. F. T.
RECTIFIER
F1
P1
F2
P2
GND.
SPEAKER
D1
M1
S.A.
D2
M2
L.A.

FIG. 136. BOTTOM WIRING OF EARLY-TYPE MODEL 60 AND 60-C.

MODEL 60 AND 60-C (Later Type)

Connections of R. F. Coil Group No. 16984

The colors of the leads to chassis and to the variable condensers are in some cases different from those specified below.

No. 1 R. F. T.

Red (1″) to chassis.
Blue to stator No. 1 V.C.
Green to Short-Antenna.
Red (long) to Long-Antenna.

No. 2 R. F. T.

Blue-white-tr. (1″) to chassis.
Blue-white-tr. (5″) to stator No. 2 V.C.
Green to P1R.
Black-white-tr., and plain black, connect to leads of corresponding color from volume control.

No. 3 R. F. T.

Blue-white-tr. (1″) to chassis.
Blue-white-tr. (5″) to stator No. 3 V.C.
Green to green lead from local-distance switch.

No. 4 R. F. T.

Blue-white-tr. (1″) to chassis.
Blue-white-tr. (5″) (with lug) to stator No. 4 V.C.
Blue-white-tr. (without lug) from stator No. 4 V.C. to GD.
Green to P3R.

Condensers in R. F. By-pass No. 1

A—1st-R. F. bias by-pass.
E—1st-R. F. screen by-pass.
F—2nd-3rd-R. F. screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in R. F. By-pass No. 2

B—R. F. bias by-pass.
C—2nd-A. F. bias by-pass.
L—Line by-pass.
L—Line by-pass.

Condensers in Detector By-pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.
P—"Phone" condenser.

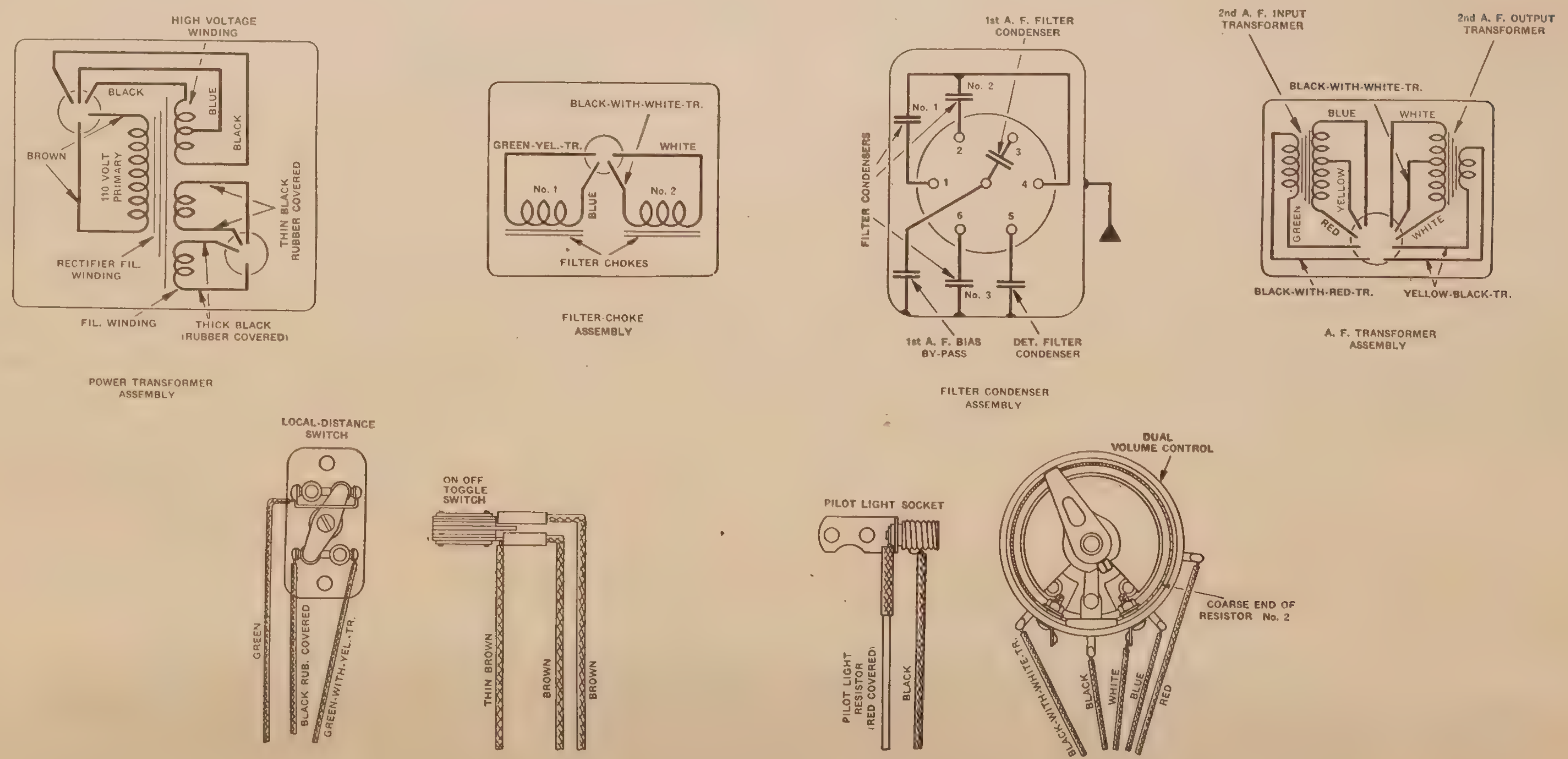

HIGH VOLTAGE WINDING
BLACK
BLUE
BLACK
BROWN
110 VOLT PRIMARY
THIN BLACK RUBBER COVERED
RECTIFIER FIL. WINDING
FIL. WINDING
THICK BLACK (RUBBER COVERED)
POWER TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
WHITE
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
1st A. F. FILTER CONDENSER
No. 2
No. 1
FILTER CONDENSERS
2
3
1
4
6
5
No. 3
1st A. F. BIAS BY-PASS
DET. FILTER CONDENSER
FILTER CONDENSER ASSEMBLY
2nd A. F. INPUT TRANSFORMER
2nd A. F. OUTPUT TRANSFORMER
BLACK-WITH-WHITE-TR.
BLUE
WHITE
GREEN
YELLOW
RED
WHITE
BLACK-WITH-RED-TR.
YELLOW-BLACK-TR.
A. F. TRANSFORMER ASSEMBLY
LOCAL-DISTANCE SWITCH
GREEN
BLACK RUB. COVERED
GREEN-WITH-YEL.-TR.
ON OFF TOGGLE SWITCH
THIN BROWN
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED)
BLACK
DUAL VOLUME CONTROL
COARSE END OF RESISTOR No. 2
BLACK-WITH-WHITE-TR.
BLACK
WHITE
BLUE
RED

FIG. 137. CONNECTIONS OF UNITS IN LATER-TYPE MODEL 60 AND 60-C.
The center-tap of the input A. F. transformer is sometimes black-with-yellow-paint. A "quality" condenser, not shown above, is connected across the primary (large winding) of the 2nd-A. F. output transformer.

MODEL 60 AND 60-C (Later Type)

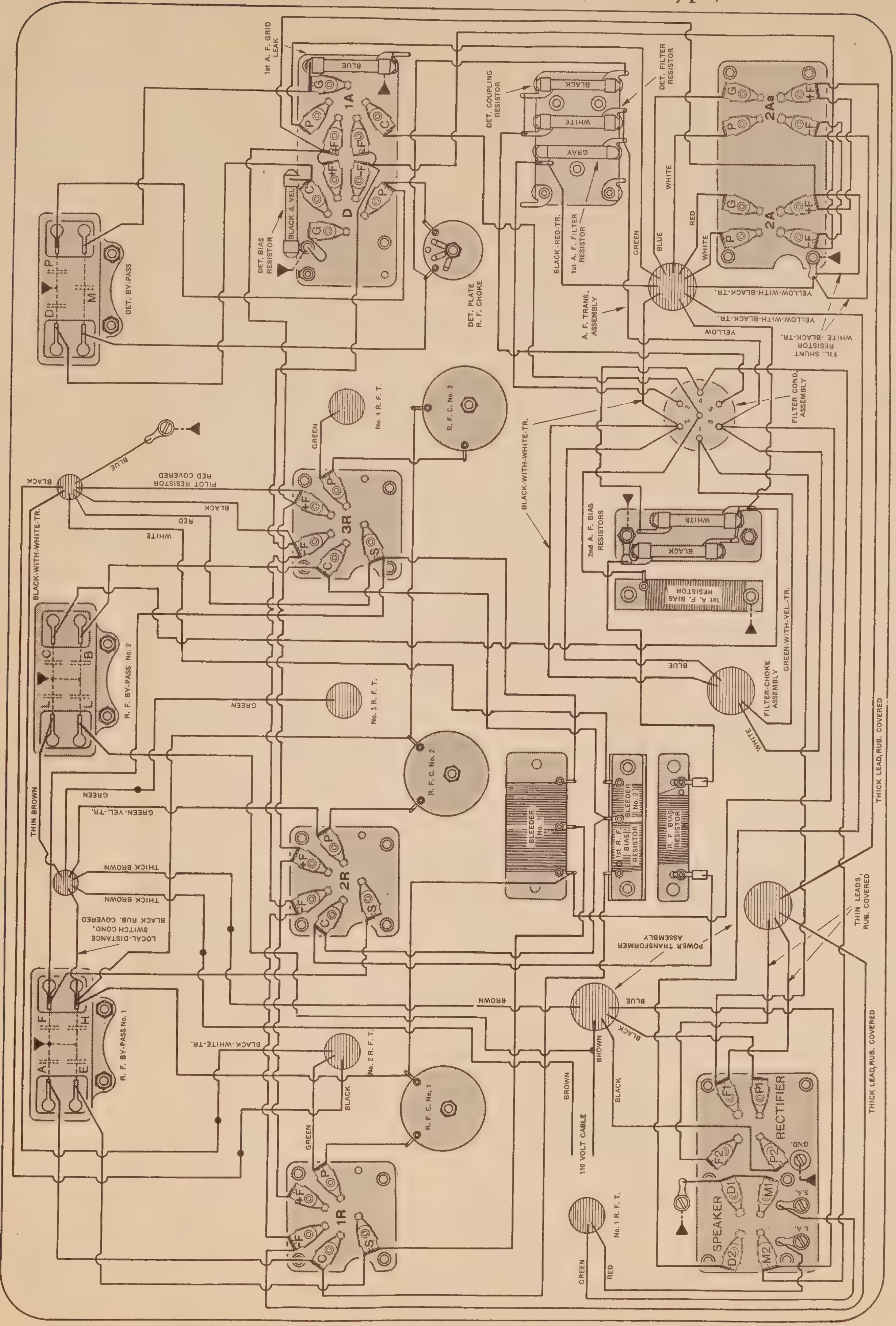

1st A. F. GRID LEAK
BLUE
1A
G
P
C
+F
-F
DET. COUPLING RESISTOR
BLACK
WHITE
GRAY
DET. FILTER RESISTOR
2Aa
2A
DET. BIAS RESISTOR
BLACK & YEL.
D
DET. PLATE R. F. CHOKE
BLACK-RED-TR.
1st A. F. FILTER RESISTOR
GREEN
RED
A. F. TRANS. ASSEMBLY
YELLOW-WITH-BLACK-TR.
YELLOW
FIL. SHUNT RESISTOR
WHITE-BLACK-TR.
DET. BY-PASS
No. 4 R. F. T.
R. F. C. No. 3
FILTER COND. ASSEMBLY
BLACK-WITH-WHITE-TR.
PILOT RESISTOR RED COVERED
3R
S
2nd A. F. BIAS RESISTORS
1st A. F. BIAS RESISTOR
R. F. BY-PASS No. 2
No. 3 R. F. T.
FILTER-CHOKE ASSEMBLY
GREEN-WITH-YEL.-TR.
THIN BROWN
R. F. C. No. 2
BLEEDER No. 1
1st R. F. BIAS RESISTOR
BLEEDER No. 2
R. F. BIAS RESISTOR
THICK LEAD, RUB. COVERED
GREEN-YEL.-TR.
THICK BROWN
2R
LOCAL-DISTANCE SWITCH COND. BLACK RUB. COVERED
POWER TRANSFORMER ASSEMBLY
THIN LEADS, RUB. COVERED
R. F. BY-PASS No. 1
BLACK-WHITE-TR.
No. 2 R. F. T.
BROWN
R. F. C. No. 1
110 VOLT CABLE
RECTIFIER
SPEAKER
GND.
S.A.
P.A.
1R
No. 1 R. F. T.

FIG. 138. BOTTOM WIRING OF LATER-TYPE MODEL 60 AND 60-C.

The 1st-A. F. bias resistor is mounted under the base of the 2nd-A. F. bias resistors. The other three wire-wound resistors are mounted together, being insulated from each other by sheets of fibre.

The lead from No. 4 V. C. to the grid contact of the detector socket is blue-with-white tracer.

The combination resistor No. 16872, comprising 1st-R. F. bias resistor and bleeder No. 2, is superseded by two separate resistors, No. 16253 being used as 1st-R. F. bias, and No. 15660 being used as bleeder No. 2.

MODEL 61 AND 61-C

Voltage Readings on Atwater Kent Model 61, 61-C Receiver (Direct Current)

Use High-Resistance D. C. Voltmeter (About 0-50-250).

	MEASURE ACROSS	APPROX. VOLTAGE		NO READING INDICATES‡
		110 V. Line	120 V. Line	
FILAMENT VOLTAGES	—F1R to +F1R.	2.9	3.2	Open R.F.C. No. 1 or No. 2, open filter choke, open filament series resistor No. 1, open 2nd-R.F. grid bias resistor, open R.F.C. No. 3 or 4.
	—F2R to +F2R.	2.9	3.2	
	—F3R to +F3R.	2.9	3.2	Open filter choke, open 3rd-R.F. or 1st-A.F. bias resistor, or open filament series resistor No. 2.
	—FD to +FD.	4.6	5	
	—F1A to +F1A.	4.6	5	
	—F2A to +F2A.	4.6	5	
	—F2Aa to +F2Aa	4.5	4.9	
PLATE VOLTAGES	—F1R to P1R.	78	85	Open primary No. 2 R.F.T.††
	—F2R to P2R.	78	85	Open primary No. 3 R.F.T.
	—F3R to P3R.	78	85	Open R.F.C. No. 5 or open primary No. 4 R.F.T.
	—FD to PD.	32	35	Open detector filter resistor, open primary No. 1 A.F.T., or open R.F.C. No. 6.
	—F1A to P1A.	50	55	Open 1st-A.F. filter resistor, or open primary No. 2 A.F.T.
	—F2A to P2A.	80	87	Open "quality" choke or primary of output transformer.
	—F2Aa to P2Aa.	75	82	
GRID VOLTAGES	—F1R to G1R.	4.6	5	Open secondary No. 1 R.F.T.
	—F2R to G2R.	1.4	1.5	Open secondary No. 2 R.F.T.
	—F3R to G3R.	0.9	1.0	Open secondary No. 3 R.F.T.
	—F1A to G1A.	1.4	1.5	Open secondary No. 1 A.F.T.
	—F2A to G2A.	9	10	Open secondary No. 2 A.F.T.
	—F2Aa to G2Aa.	9	10	
SCREEN VOLTAGES	—F3R to S3R.	60	65	Open volume control circuit.
	—F2R to S2R.	46	50	
	—F1R to S1R.*	46	50	Open No. 1 screen-grid resistor.†

* Volume-control knob at minimum for this test.

† If 1st-R. F. screen-grid voltage is about 100, with volume-control knob set at minimum, No. 2 R. F. screen-grid resistor may be open.

†† In later Model 61 and 61-C, the primaries of No. 2, 3 and 4 R. F. T. are replaced by R. F. choke coils mounted under the chassis.

‡ Low plate, grid, screen, or filament voltages may indicate a shorted by-pass for the respective circuits.

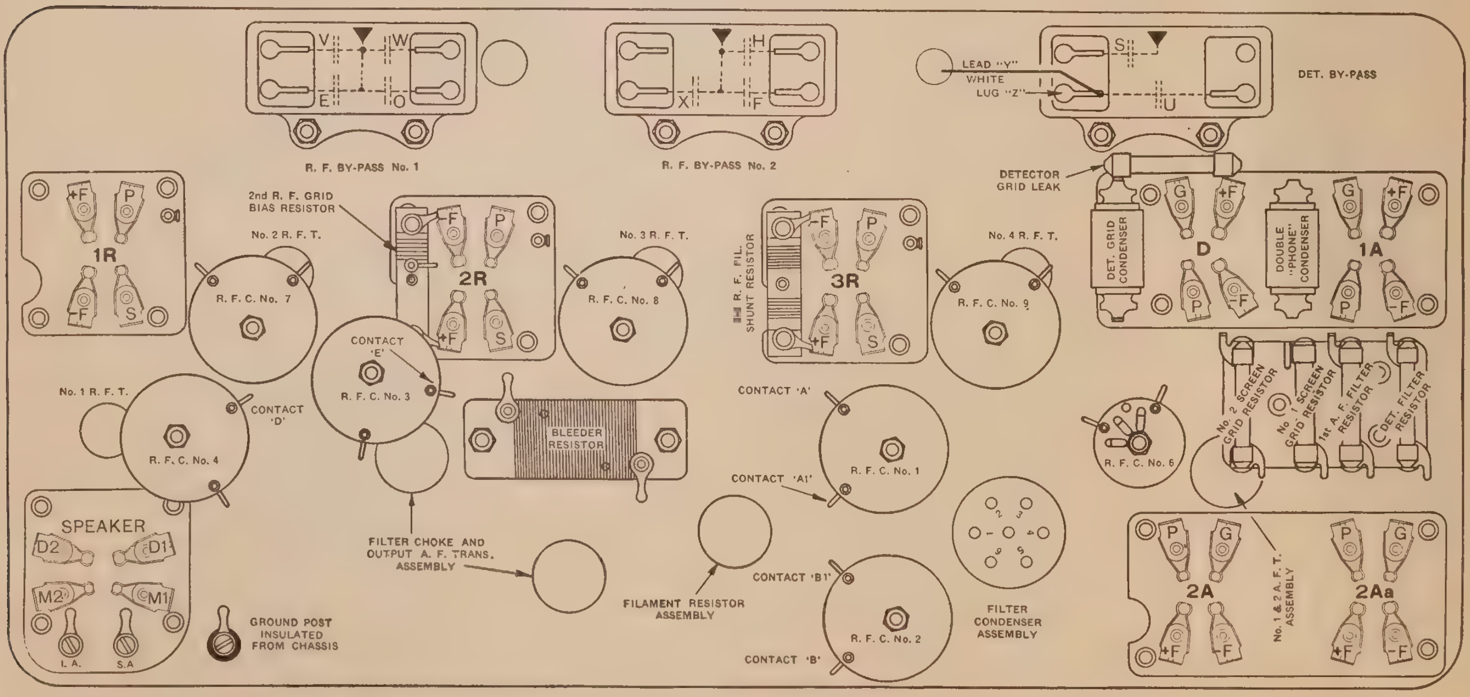

V
W
E
O
R. F. BY-PASS No. 1
H
X
F
R. F. BY-PASS No. 2
S
LEAD "Y"
WHITE
LUG "Z"
U
DET. BY-PASS
+F
P
1R
-F
S
2nd R. F. GRID BIAS RESISTOR
No. 2 R. F. T.
R. F. C. No. 7
-F
P
2R
+F
S
No. 3 R. F. T.
R. F. C. No. 8
R. F. FIL. SHUNT RESISTOR
-F
P
3R
+F
S
No. 4 R. F. T.
R. F. C. No. 9
DETECTOR GRID LEAK
DET. GRID CONDENSER
G
+F
D
P
-F
DOUBLE "PHONE" CONDENSER
G
+F
1A
P
-F
CONTACT 'E'
R. F. C. No. 3
No. 1 R. F. T.
CONTACT 'D'
R. F. C. No. 4
BLEEDER RESISTOR
CONTACT 'A'
R. F. C. No. 1
CONTACT 'A1'
No. 2 SCREEN GRID RESISTOR
No 1 SCREEN GRID RESISTOR
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
R. F. C. No. 6
SPEAKER
D2
D1
M2
M1
L. A.
S.A
GROUND POST INSULATED FROM CHASSIS
FILTER CHOKE AND OUTPUT A. F. TRANS. ASSEMBLY
FILAMENT RESISTOR ASSEMBLY
CONTACT 'B1'
R. F. C. No. 2
CONTACT 'B'
1
2
3
4
5
6
FILTER CONDENSER ASSEMBLY
P
G
2A
+F
-F
No. 1 & 2 A. F. T. ASSEMBLY
P
G
2Aa
+F
-F

Fig. 139. Bottom Chart of Later-Type Model 61 and 61-C.

MODEL 61 AND 61-C

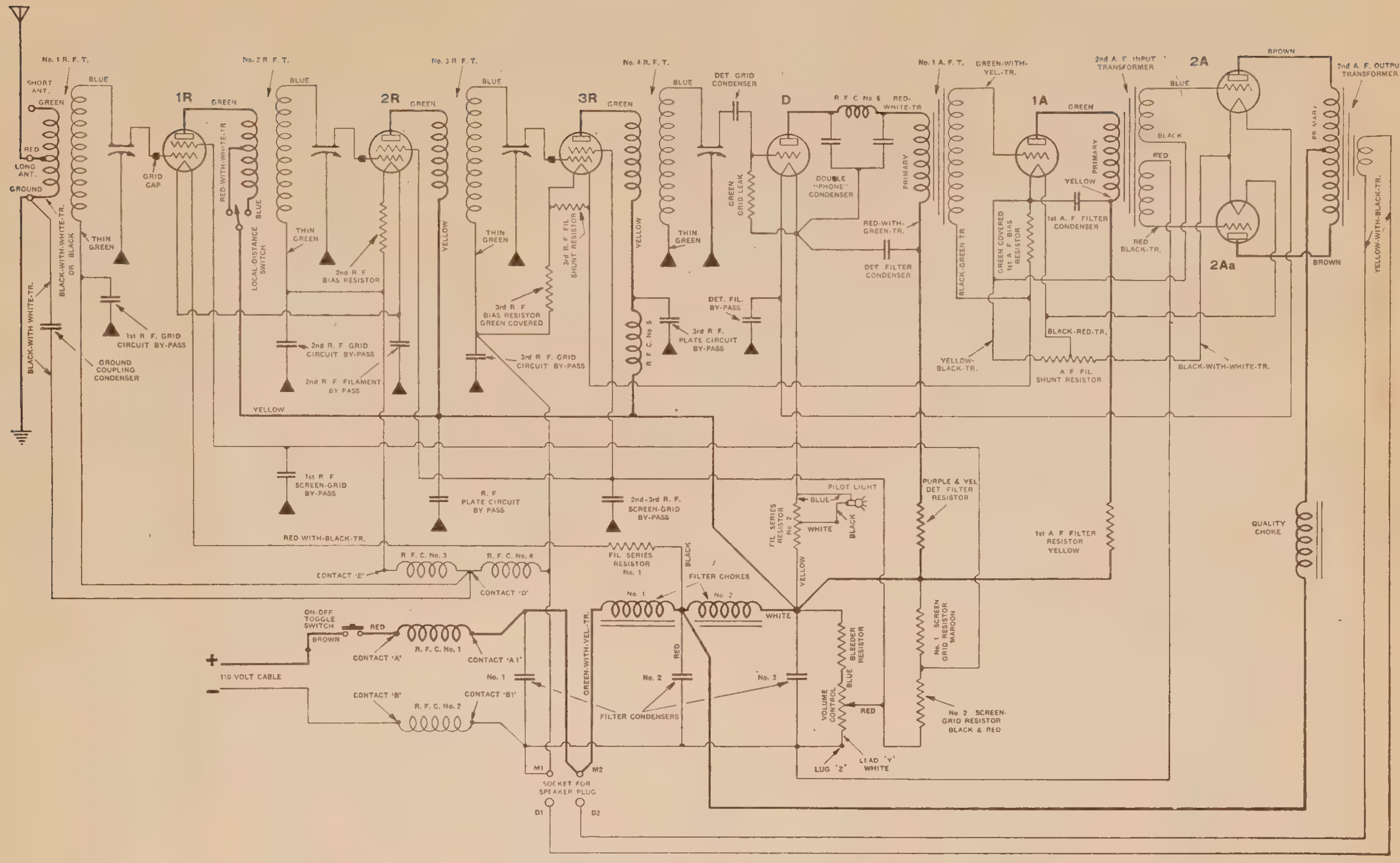

No. 1 R. F. T.
SHORT ANT.
GREEN
RED
LONG ANT.
GROUND
BLUE
1R
GRID CAP
THIN GREEN
BLACK-WITH-WHITE-TR.
BLACK-WITH-WHITE-TR. OR BLACK
1st R. F. GRID CIRCUIT BY-PASS
GROUND COUPLING CONDENSER
No. 2 R. F. T.
RED-WITH-WHITE-TR.
LOCAL-DISTANCE SWITCH
2R
2nd R. F. BIAS RESISTOR
2nd R. F. GRID CIRCUIT BY-PASS
2nd R. F. FILAMENT BY-PASS
YELLOW
No. 3 R. F. T.
3R
3rd R. F. FIL. SHUNT RESISTOR
3rd R. F. BIAS RESISTOR GREEN COVERED
3rd R. F. GRID CIRCUIT BY-PASS
No. 4 R. F. T.
R. F. C. No. 5
3rd R. F. PLATE CIRCUIT BY-PASS
DET. GRID CONDENSER
D
GREEN GRID LEAK
R. F. C. No. 6
RED-WHITE-TR.
DOUBLE "PHONE" CONDENSER
RED-WITH-GREEN-TR.
DET. FILTER CONDENSER
DET. FIL. BY-PASS
No. 1 A. F. T.
GREEN-WITH-YEL.-TR.
PRIMARY
1A
BLACK-GREEN TR.
GREEN COVERED 1st A. F. BIAS RESISTOR
1st A. F. FILTER CONDENSER
YELLOW-BLACK-TR.
BLACK-RED-TR.
A. F. FIL. SHUNT RESISTOR
2nd A. F. INPUT TRANSFORMER
2A
2Aa
BROWN
BLACK
RED
RED-BLACK-TR.
2nd A. F. OUTPUT TRANSFORMER
BLACK-WITH-WHITE-TR.
YELLOW-WITH-BLACK-TR.
1st R. F. SCREEN-GRID BY-PASS
R. F. PLATE CIRCUIT BY-PASS
2nd-3rd R. F. SCREEN-GRID BY-PASS
RED WITH-BLACK-TR.
PILOT LIGHT
FIL. SERIES RESISTOR No. 2
WHITE
BLACK
PURPLE & YEL. DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR YELLOW
QUALITY CHOKE
R. F. C. No. 3
R. F. C. No. 4
CONTACT 'E'
CONTACT 'D'
FIL. SERIES RESISTOR No. 1
FILTER CHOKES
No. 1
No. 2
ON-OFF TOGGLE SWITCH
BROWN
R. F. C. No. 1
CONTACT 'A'
CONTACT 'A1'
110 VOLT CABLE
CONTACT 'B'
CONTACT 'B1'
R. F. C. No. 2
GREEN-WITH-YEL.-TR.
No. 3
FILTER CONDENSERS
BLEEDER RESISTOR
VOLUME CONTROL
No. 1 SCREEN GRID RESISTOR MAROON
No. 2 SCREEN-GRID RESISTOR BLACK & RED
LUG 'Z'
LEAD 'Y' WHITE
M1
M2
SOCKET FOR SPEAKER PLUG
D1
D2

FIG. 140. DIAGRAM OF EARLY MODEL 61 AND 61-C (DIRECT CURRENT).

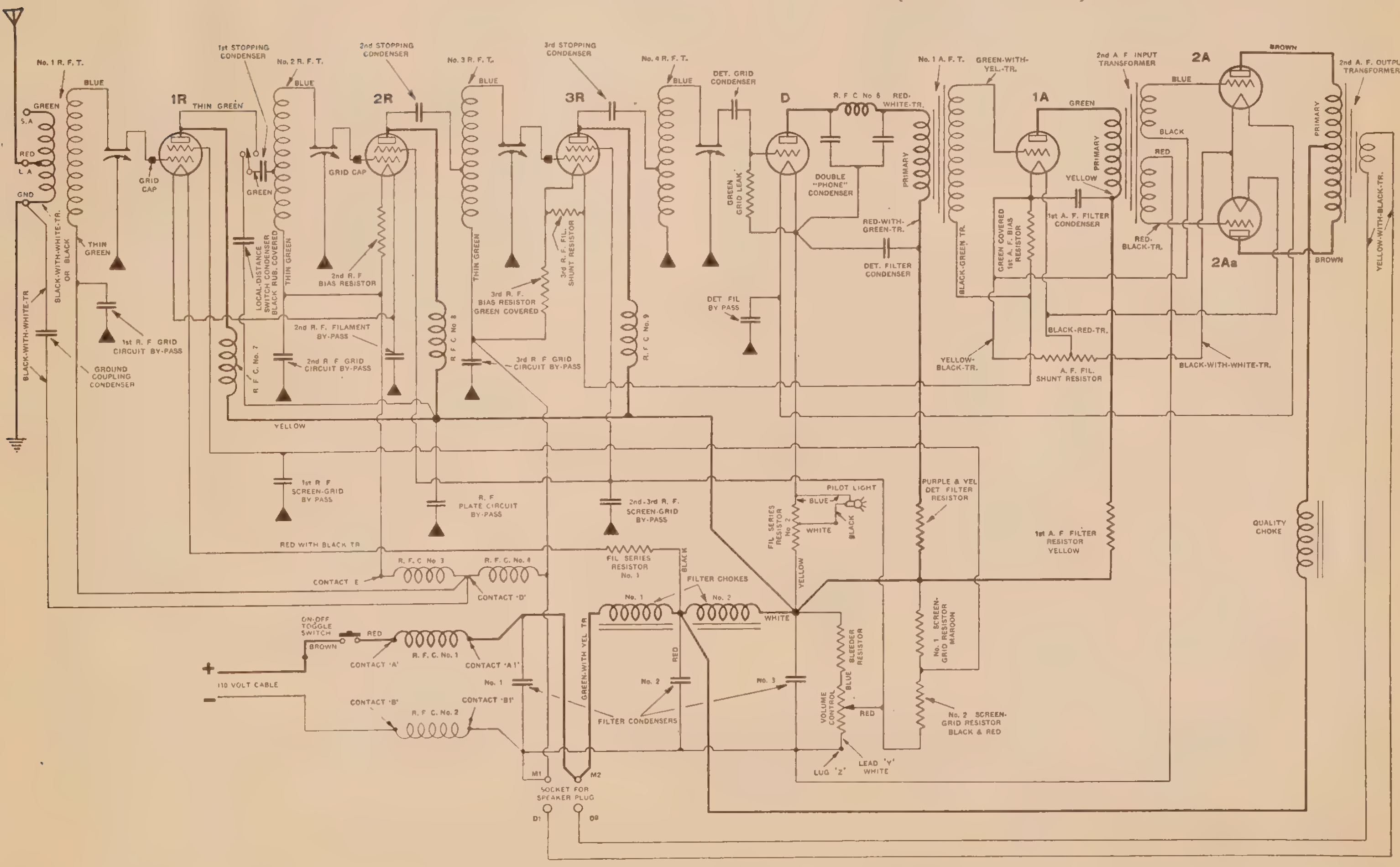

No. 1 R. F. T.
GREEN
S. A.
RED
L. A.
GND
BLUE
1R
THIN GREEN
1st STOPPING CONDENSER
GRID CAP
BLACK-WITH-WHITE-TR. OR BLACK
BLACK-WITH-WHITE-TR.
1st R. F. GRID CIRCUIT BY-PASS
GROUND COUPLING CONDENSER
No. 2 R. F. T.
LOCAL-DISTANCE SWITCH CONDENSER BLACK RUB. COVERED
R. F. C. No. 7
2nd STOPPING CONDENSER
2R
2nd R. F. BIAS RESISTOR
2nd R. F. FILAMENT BY-PASS
2nd R. F. GRID CIRCUIT BY-PASS
YELLOW
No. 3 R. F. T.
3rd STOPPING CONDENSER
3R
R. F. C. No. 8
3rd R. F. FIL. SHUNT RESISTOR
3rd R. F. BIAS RESISTOR GREEN COVERED
3rd R. F. GRID CIRCUIT BY-PASS
No. 4 R. F. T.
R. F. C. No. 9
DET. GRID CONDENSER
D
GREEN GRID LEAK
R. F. C. No. 6
RED-WHITE-TR.
DOUBLE "PHONE" CONDENSER
RED-WITH-GREEN-TR.
DET. FILTER CONDENSER
DET. FIL. BY PASS
No. 1 A. F. T.
GREEN-WITH-YEL.-TR.
PRIMARY
1A
BLACK-GREEN TR.
GREEN COVERED 1st A. F. BIAS RESISTOR
1st A. F. FILTER CONDENSER
YELLOW-BLACK-TR.
BLACK-RED-TR.
A. F. FIL. SHUNT RESISTOR
2nd A. F. INPUT TRANSFORMER
2A
2Aa
BROWN
BLACK
RED
RED-BLACK-TR.
2nd A. F. OUTPUT TRANSFORMER
BLACK-WITH-WHITE-TR.
YELLOW-WITH-BLACK-TR.
1st R. F. SCREEN-GRID BY PASS
R. F. PLATE CIRCUIT BY-PASS
2nd-3rd R. F. SCREEN-GRID BY-PASS
RED WITH BLACK TR.
PILOT LIGHT
FIL. SERIES RESISTOR No. 2
WHITE
BLACK
PURPLE & YEL. DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR YELLOW
QUALITY CHOKE
R. F. C. No. 3
R. F. C. No. 4
CONTACT E
CONTACT 'D'
FIL. SERIES RESISTOR No. 1
FILTER CHOKES
ON-OFF TOGGLE SWITCH
BROWN
R. F. C. No. 1
CONTACT 'A'
CONTACT 'A1'
110 VOLT CABLE
CONTACT 'B'
CONTACT 'B1'
R. F. C. No. 2
GREEN-WITH YEL. TR.
FILTER CONDENSERS
BLEEDER RESISTOR
VOLUME CONTROL
No. 1 SCREEN-GRID RESISTOR MAROON
No. 2 SCREEN-GRID RESISTOR BLACK & RED
LUG 'Z'
LEAD 'Y' WHITE
M1
M2
SOCKET FOR SPEAKER PLUG
D1
D2

FIG. 141. SCHEMATIC DIAGRAM OF LATER MODEL 61 AND 61-C (DIRECT CURRENT).

Note that R. F. C. No. 5, in diagram of early Model 61 and 61-C above, is omitted from the later Model, and the number (R. F. C. No. 5) is skipped to avoid confusion.

MODEL 61 AND 61-C (Early Type)

Connections of R. F. Coil Group No. 16469

No. 1 R. F. T.

Thin green to by-pass V.
Blue to stator No. 1 V. C.
Thick green to Short-Antenna.
Red to Long-Antenna.
Black-white to ground post.

No. 2 R. F. T.

Thin green to by-pass W.
Blue (with lug) to stator No. 2 V. C.
Thick green to P1R.
Thick blue and red-white to leads of corresponding color from local-distance switch.

No. 3 R. F. T.

Thin green to by-pass X.
Thick green to P2R.
Blue to stator No. 3 V. C.
Yellow to by-pass H.

No. 4 R. F. T.

Thin green to chassis.
Thick green to P3R.
Blue (with lug) to stator No. 4 V. C.
Blue to detector grid condenser.
Yellow to R. F. C No. 5.

Condensers in R. F. By-Pass No. 1

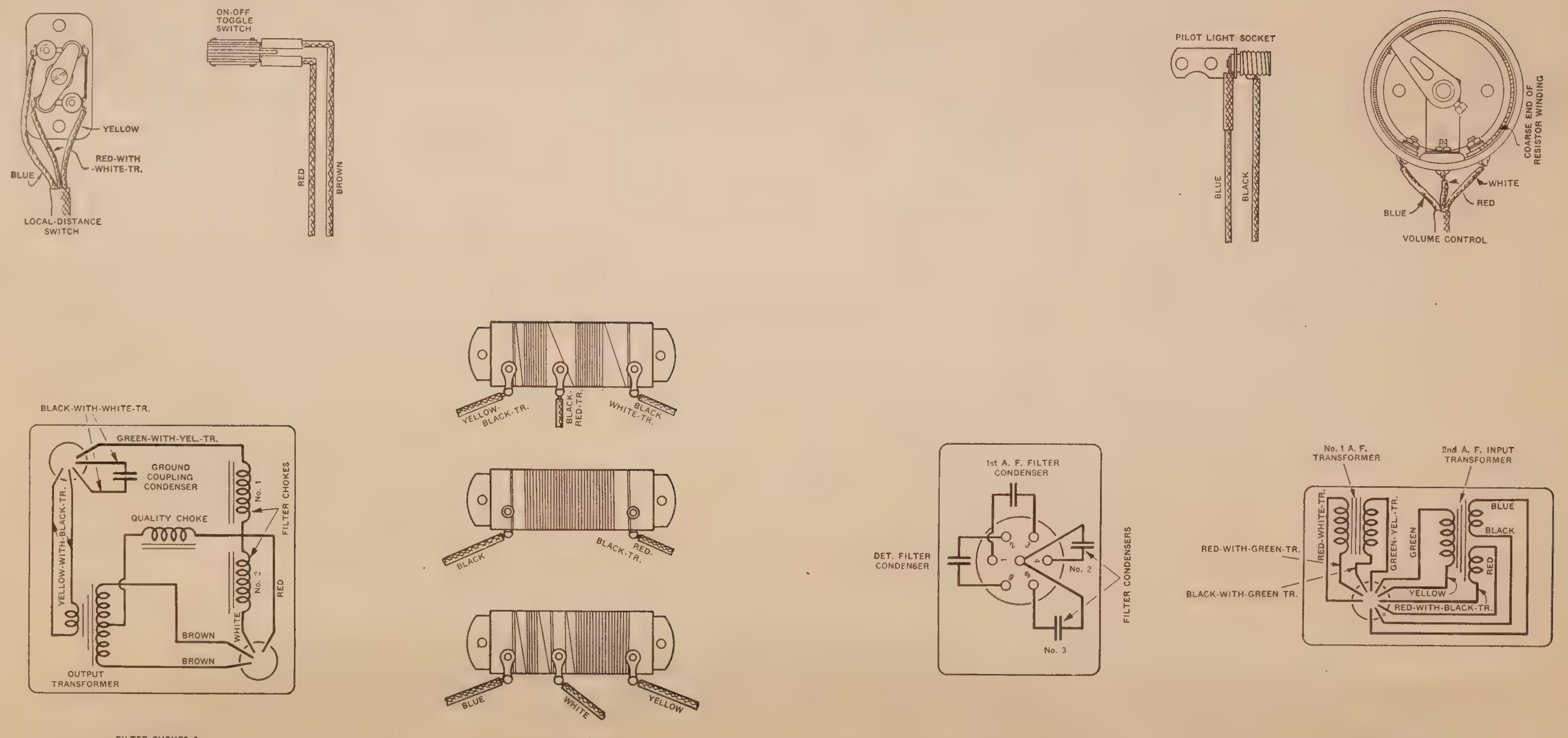
E—1st-R. F. screen by-pass.
O—2nd-R. F. filament by-pass.
V—1st-R. F. grid-circuit by-pass.
W—2nd-R. F. grid-circuit by-pass.

Condensers in R. F. By-Pass No. 2

F—2nd-3rd-R. F. screen by-pass.
H—1st-2nd-R. F. plate-circuit by-pass.
X—3rd-R. F. grid-circuit by-pass.
Z—3rd-R. F. plate-circuit by-pass.

Condensers in Detector By-Pass

S—Detector filament by-pass.
U—Filter condenser No. 1.


YELLOW
RED-WITH -WHITE-TR.
BLUE
LOCAL-DISTANCE SWITCH
ON-OFF TOGGLE SWITCH
RED
BROWN
PILOT LIGHT SOCKET
BLUE
BLACK
COARSE END OF RESISTOR WINDING
WHITE
RED
BLUE
VOLUME CONTROL
BLACK-WITH-WHITE-TR.
GREEN-WITH-YEL.-TR.
GROUND COUPLING CONDENSER
QUALITY CHOKE
No. 1
No. 2
FILTER CHOKES
RED
YELLOW-WITH-BLACK-TR.
WHITE
BROWN
BROWN
OUTPUT TRANSFORMER
YELLOW-BLACK-TR.
BLACK-RED-TR.
WHITE-TR. BLACK
BLACK
BLACK-TR. RED
BLUE
WHITE
YELLOW
1st A. F. FILTER CONDENSER
DET. FILTER CONDENSER
No. 2
No. 3
FILTER CONDENSERS
No. 1 A. F. TRANSFORMER
2nd A. F. INPUT TRANSFORMER
RED-WITH-GREEN-TR.
BLACK-WITH-GREEN TR.
RED-WHITE-TR.
GREEN-YEL.-TR.
GREEN
BLUE
BLACK
RED
YELLOW
RED-WITH-BLACK-TR.
⑩

FILTER CHOKES & OUTPUT TRANSFORMER ASSEMBLY

FILAMENT RESISTOR ASSEMBLY

FILTER CONDENSER ASSEMBLY

No. 1 & 2 A. F. T. ASSEMBLY

Fig. 142. Connections of Units in Early-Type Model 61 and 61-C.

MODEL 61 AND 61-C (Early Type)

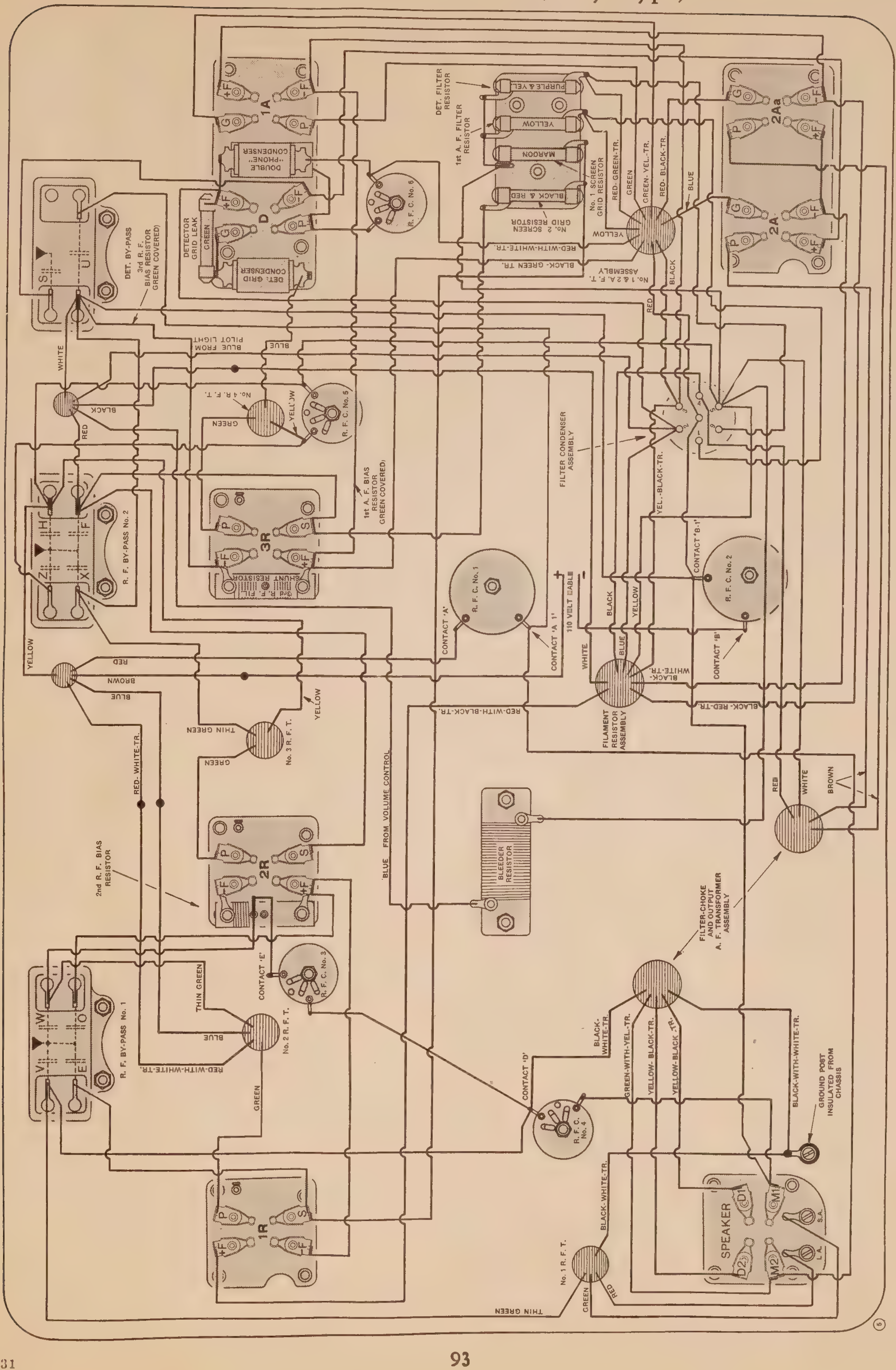

1A
+F
-F
G
P
DOUBLE "PHONE" CONDENSER
D
DETECTOR GRID LEAK
GREEN
DET. GRID CONDENSER
R. F. C. No. 6
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
PURPLE & YEL.
YELLOW
MAROON
BLACK & RED
No. 1 SCREEN GRID RESISTOR
No. 2 SCREEN GRID RESISTOR
RED-WITH-WHITE-TR.
BLACK-GREEN TR.
No. 1 & 2 A. F. T. ASSEMBLY
YELLOW
GREEN
RED-GREEN-TR.
GREEN-YEL.-TR.
RED-BLACK-TR.
BLUE
BLACK
RED
2Aa
2A
DET. BY-PASS
DET. R. F. 3rd R. F. BIAS RESISTOR GREEN COVERED)
S
U
WHITE
BLUE FROM PILOT LIGHT
BLUE
BLACK
RED
No. 4 R. F. T.
GREEN
YELLOW
R. F. C. No. 5
H
F
Z
X
R. F. BY-PASS No. 2
3R
S
3rd R. F. FIL. SHUNT RESISTOR
1st A. F. BIAS RESISTOR GREEN COVERED)
FILTER CONDENSER ASSEMBLY
YEL.-BLACK-TR.
CONTACT 'B-1'
R. F. C. No. 2
CONTACT 'B'
R. F. C. No. 1
CONTACT 'A'
CONTACT 'A 1'
110 VOLT CABLE
+
-
BLACK
YELLOW
WHITE
BLUE
BLACK-WHITE-TR.
BLACK-RED-TR.
RED-WITH-BLACK-TR.
FILAMENT RESISTOR ASSEMBLY
YELLOW
RED
BROWN
BLUE
THIN GREEN
No. 3 R. F. T.
YELLOW
GREEN
RED-WHITE-TR.
BLUE FROM VOLUME CONTROL
2nd R. F. BIAS RESISTOR
2R
BLEEDER RESISTOR
RED
WHITE
BROWN
FILTER-CHOKE AND OUTPUT A. F. TRANSFORMER ASSEMBLY
W
O
V
E
R. F. BY-PASS No. 1
THIN GREEN
CONTACT 'E'
R. F. C. No. 3
No. 2 R. F. T.
BLUE
RED-WITH-WHITE-TR.
GREEN
CONTACT 'D'
R. F. C. No. 4
BLACK-WHITE-TR.
GREEN-WITH-YEL.-TR.
YELLOW-BLACK-TR.
YELLOW-BLACK-TR.
BLACK-WITH-WHITE-TR.
GROUND POST INSULATED FROM CHASSIS
1R
SPEAKER
D1
D2
M1
M2
S.A.
L.A.
BLACK-WHITE-TR.
No. 1 R. F. T.
GREEN
RED
THIN GREEN
⑥

Fig. 143. Bottom Wiring of Early-Type Model 61 and 61-C.

MODEL 61 AND 61-C (Later Type)

Connections of R. F. Coil Group No. 17095

The colors of the leads to the variable condensers are in some cases different from those specified below.

No. 1 R. F. T.

Thin green to by-pass V.
Blue to stator No. 1 V.C.
Thick green to Short-Antenna.
Red to Long-Antenna.
Black-with-white-tr. or plain black, to ground post.

No. 2 R. F. T.

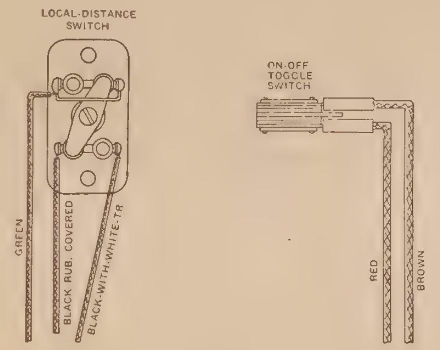
Thin green to by-pass W.
Blue-white-tr. to stator No. 2 V.C.
Thick green to green lead from local-distance switch. (The end of this green lead is stripped of insulation but the strands of wire are NOT soldered.)

No. 3 R. F. T.

Thin green or green-with-white-tr. to by-pass X.
Blue to stator No. 3 V.C.
Thick green to P2R. (The end of this lead is stripped of insulation and the strands of wire are soldered.)

No. 4 R. F. T.

Blue (1") to chassis.
Blue-white-tr. (5") (with lug) to stator No. 4 V.C.
Blue (without lug) from stator No. 4 V. C. to detector grid condenser.
Thick green to P3R.


LOCAL-DISTANCE SWITCH
GREEN
BLACK RUB. COVERED
BLACK-WITH-WHITE-TR
ON-OFF TOGGLE SWITCH
RED
BROWN

Condensers in R. F. By-Pass No. 1

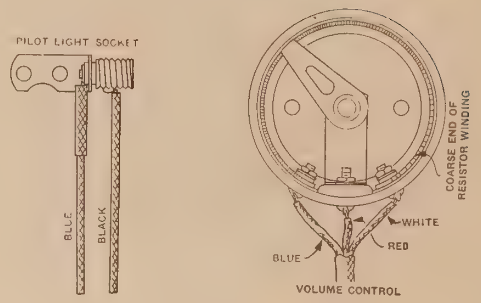
E—1st-R. F. screen by-pass.
O—2nd-R. F. filament by-pass.
V—1st-R. F. grid-circuit by-pass.
W—2nd-R. F. grid-circuit by-pass.

Condensers in R. F. By-Pass No. 2

F—2nd-3rd-R. F. screen by-pass.
H—R. F. plate-circuit by-pass.
X—3rd-R. F. grid-circuit by-pass.

Condensers in Detector By-Pass

S—Detector filament by-pass.
U—Filter condenser No. 1.


PILOT LIGHT SOCKET
BLUE
BLACK
COARSE END OF RESISTOR WINDING
WHITE
RED
BLUE
VOLUME CONTROL

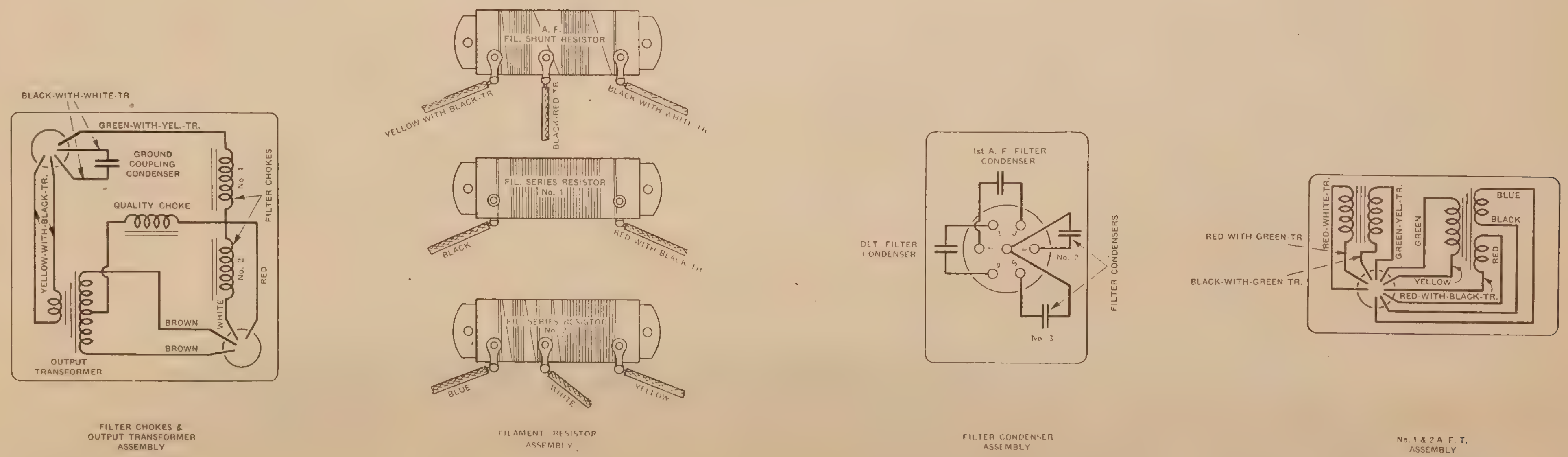

BLACK-WITH-WHITE-TR
GREEN-WITH-YEL.-TR.
GROUND COUPLING CONDENSER
No 1
FILTER CHOKES
QUALITY CHOKE
YELLOW-WITH-BLACK-TR.
No. 2
RED
WHITE
BROWN
BROWN
OUTPUT TRANSFORMER
FILTER CHOKES & OUTPUT TRANSFORMER ASSEMBLY
A. F. FIL. SHUNT RESISTOR
YELLOW WITH BLACK-TR
BLACK-RED TR
BLACK WITH WHITE TR
FIL. SERIES RESISTOR No. 1
BLACK
RED WITH BLACK TR
FIL. SERIES RESISTOR No. 2
BLUE
WHITE
YELLOW
FILAMENT RESISTOR ASSEMBLY
1st A. F. FILTER CONDENSER
DET. FILTER CONDENSER
No. 2
No. 3
FILTER CONDENSERS
FILTER CONDENSER ASSEMBLY
RED WITH GREEN-TR
BLACK-WITH-GREEN TR.
RED-WHITE-TR.
GREEN-YEL.-TR.
GREEN
YELLOW
RED-WITH-BLACK-TR.
BLUE
BLACK
RED
No. 1 & 2 A. F. T. ASSEMBLY

Fig. 144. Connections of Units in Later-Type Model 61 and 61-C.
On some volume controls for Model 61 and 61-C, a white-with-black-tracer lead is used in place of a white lead.
See Page 106 for simplified power-unit circuit of Model 61 and 61-C.

MODEL 61 AND 61-C (Later Type)

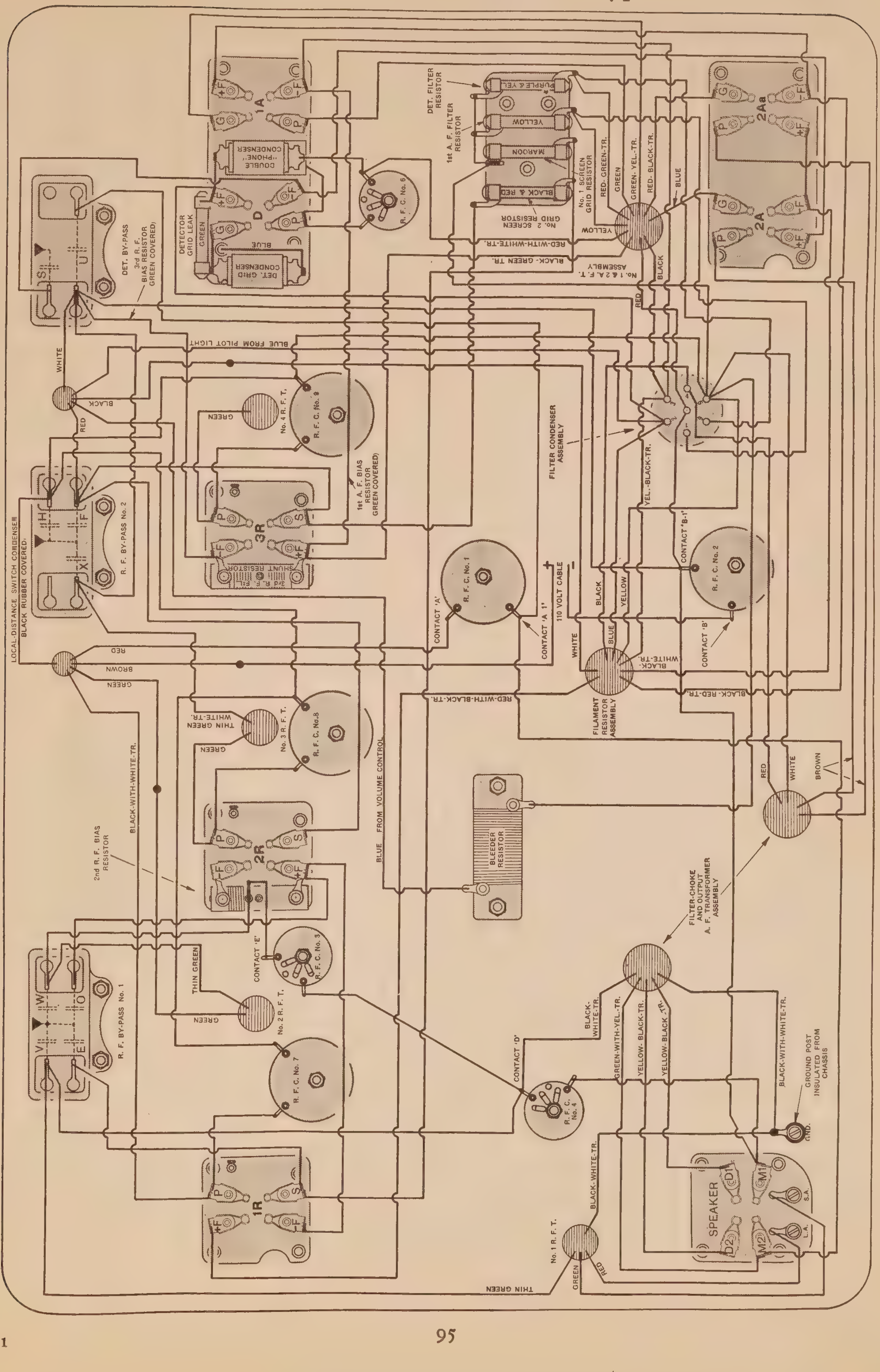

DET. FILTER RESISTOR
PURPLE & YEL.
YELLOW
MAROON
BLACK & RED
1st A. F. FILTER RESISTOR
No. 1 SCREEN GRID RESISTOR
No. 2 SCREEN GRID RESISTOR
RED-GREEN-TR.
GREEN
GREEN-YEL.-TR.
RED-BLACK-TR.
BLUE
YELLOW
RED-WITH-WHITE-TR.
BLACK-GREEN TR.
No. 1 & 2 A. F. T. ASSEMBLY
BLACK
RED
1A
+F
-F
G
P
DOUBLE "PHONE" CONDENSER
D
DETECTOR GRID LEAK
GREEN
BLUE
DET. GRID CONDENSER
R. F. C. No. 6
2Aa
2A
DET. BY-PASS
3rd R. F. BIAS RESISTOR GREEN COVERED)
S
U
T
BLUE FROM PILOT LIGHT
WHITE
BLACK
RED
GREEN
No. 4 R. F. T.
R. F. C. No. 9
FILTER CONDENSER ASSEMBLY
1st A. F. BIAS RESISTOR (GREEN COVERED)
3R
3rd R. F. FIL. SHUNT RESISTOR
H
F
X
R. F. BY-PASS No. 2
LOCAL-DISTANCE SWITCH CONDENSER BLACK RUBBER COVERED
YEL.-BLACK-TR.
CONTACT "B-1"
R. F. C. No. 2
CONTACT 'B'
R. F. C. No. 1
CONTACT 'A'
CONTACT 'A 1'
110 VOLT CABLE
+
-
BLACK
YELLOW
WHITE
BLUE
BLACK-WHITE-TR.
FILAMENT RESISTOR ASSEMBLY
BLACK-RED-TR.
RED-WITH-BLACK-TR.
RED
BROWN
GREEN
THIN GREEN WHITE-TR.
No. 3 R. F. T.
R. F. C. No. 8
GREEN
BLUE FROM VOLUME CONTROL
BLACK-WITH-WHITE-TR.
2nd R. F. BIAS RESISTOR
2R
BLEEDER RESISTOR
RED
WHITE
BROWN
FILTER-CHOKE AND OUTPUT A. F. TRANSFORMER ASSEMBLY
CONTACT 'E'
R. F. C. No. 3
THIN GREEN
GREEN
No. 2 R. F. T.
W
O
V
E
R. F. BY-PASS No. 1
R. F. C. No. 7
CONTACT 'D'
R. F. C. No. 4
BLACK-WHITE-TR.
GREEN-WITH-YEL.-TR.
YELLOW-BLACK-TR.
YELLOW-BLACK-TR.
BLACK-WITH-WHITE-TR.
GROUND POST INSULATED FROM CHASSIS
GND.
SPEAKER
D1
D2
M1
M2
S.A.
L.A.
1R
BLACK-WHITE-TR.
No. 1 R. F. T.
GREEN
RED
THIN GREEN

FIG. 145. BOTTOM WIRING OF LATER-TYPE MODEL 61 AND 61-C.

MODEL 66

Voltage Readings on Atwater Kent Model 66 Receiver (60 Cycle)

Use High Resistance D. C. Voltmeter (About 0-50-250-500) to Measure Plate and Grid Voltages. Use A. C. Voltmeter to Measure Filament Voltages.

	MEASURE ACROSS	APPROX. VOLTAGE		NO READING INDICATES ‡
		110 V. Line	120 V. Line	
FILAMENT VOLTAGES	—F to +F Contacts on the detector, 1st-A.F. and each R.F. Socket.	2.2	2.4	Open filament winding or connection.
	—F to +F on each 2nd-A.F. Socket.	6.9	7.5	
	F1 to F2 on Rectifier Tube Socket.	6.9	7.5	
PLATE VOLTAGES	C1R to P1R.	158	173	Open high voltage winding, open filter choke, open R.F. resistor, open R.F.C. No. 1, open R.F. bias resistor or 1st-R.F. bias resistor or open speaker field coil.
	C2R to P2R.	160	175	Open R.F.C. No. 2.
	C3R to P3R.	160	175	Open R.F.C. No. 3.
	CD to PD.	206	225	Open detector filter resistor, coupling resistor, R.F. choke, or det. bias resistor.
	C1A to P1A.	137	150	Open 1st A.F. filter resistor, primary of A.F. input transformer, or 1st-A.F. bias.
	—F2A to P2A.	412	450	Open primary of output transformer.
	—F2Aa to P2Aa.	412	450	
GRID VOLTAGES	C1R to G1R.	5.5	6	Open secondary No. 1 R.F.T.
	C2R to G2R.	2.8	3	Open secondary No. 2 R.F.T.
	C3R to G3R.	2.8	3	Open secondary No. 3 R.F.T.
	CD to GD.	23	25	Open secondary No. 4 R.F.T.
	C1A to G1A.*	2.8	3	Open 1st-A.F. grid leak.
	—F2A to G2A.	78	85	Open secondary of input-A.F. transformer, or open 2nd-A.F. grid-filter resistor.
	—F2Aa to G2Aa.	78	85	
SCREEN VOLTAGES†	C1R to S1R.	110	120	Open No. 1 bleeder resistor.
	C2R to S2R.	78	85	Open No. 2 volume control.
	C3R to S3R.	78	85	

* This is the measured voltage, not the actual operating voltage.
‡ Low plate, grid, or screen voltages may indicate a partially shorted by-pass condenser.
† High screen voltages may indicate an open No. 2 volume control or open No. 1 or 2 bleeder resistor.

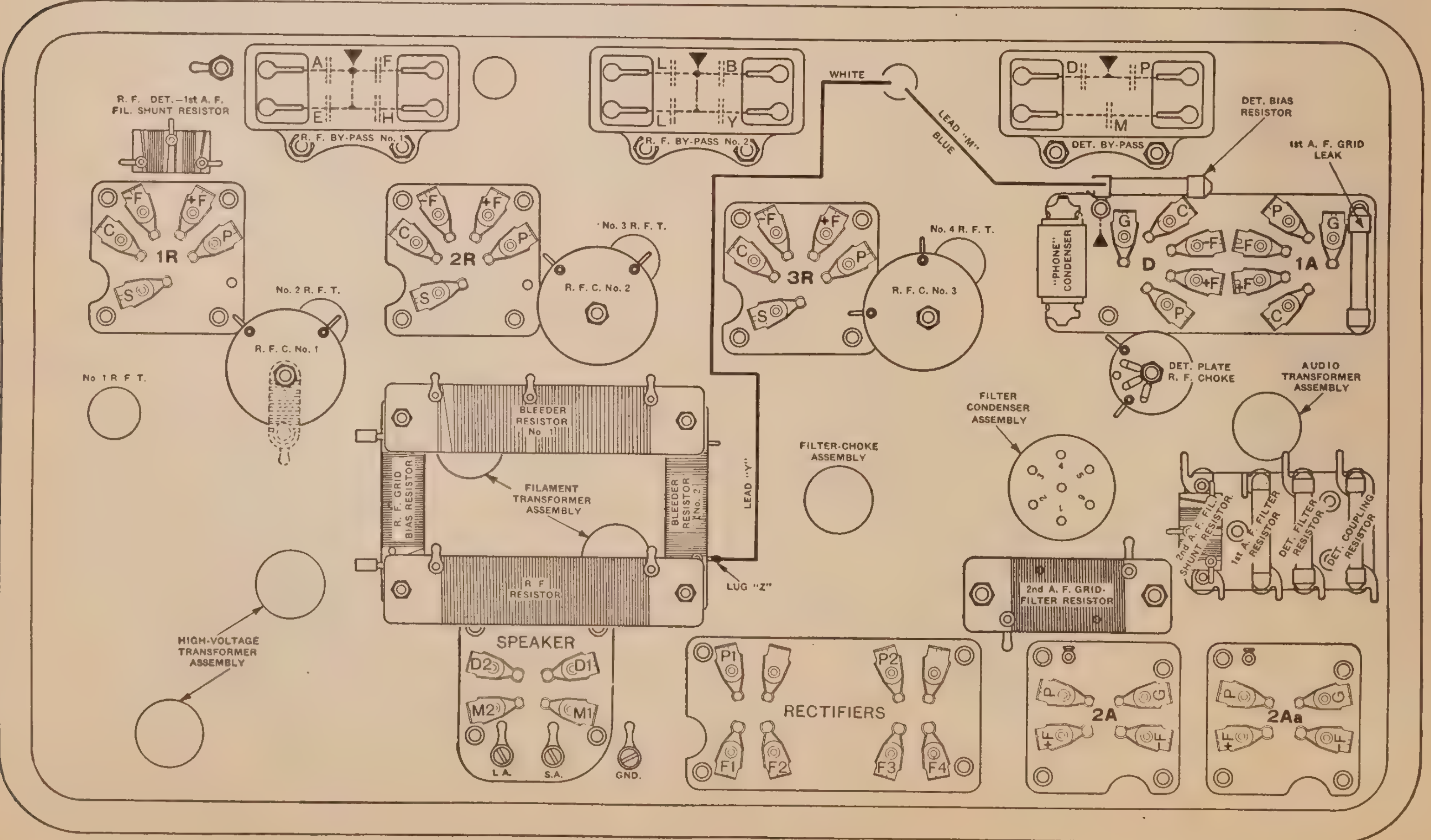

R. F. DET.—1st A. F. FIL. SHUNT RESISTOR
A
F
E
H
R. F. BY-PASS No. 1
L
B
L
Y
R. F. BY-PASS No. 2
WHITE
LEAD "M"
BLUE
D
P
M
DET. BY-PASS
DET. BIAS RESISTOR
1st A. F. GRID LEAK
1R
2R
No. 3 R. F. T.
R. F. C. No. 2
3R
No. 4 R. F. T.
R. F. C. No. 3
"PHONE" CONDENSER
D
1A
No. 2 R. F. T.
R. F. C. No. 1
No 1 R F T.
BLEEDER RESISTOR No. 1
R. F. GRID BIAS RESISTOR
FILAMENT TRANSFORMER ASSEMBLY
BLEEDER RESISTOR No. 2
LEAD "Y"
FILTER-CHOKE ASSEMBLY
FILTER CONDENSER ASSEMBLY
DET. PLATE R. F. CHOKE
AUDIO TRANSFORMER ASSEMBLY
2nd A. F. FIL. SHUNT RESISTOR
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
R F RESISTOR
LUG "Z"
2nd A. F. GRID-FILTER RESISTOR
HIGH-VOLTAGE TRANSFORMER ASSEMBLY
SPEAKER
D2
D1
M2
M1
L.A.
S.A.
GND.
P1
P2
RECTIFIERS
F1
F2
F3
F4
2A
2Aa

Fig. 146. Bottom Chart of Model 66.
The resistor shown in dotted lines is the old-style R. F. bias resistor.

MODEL 66

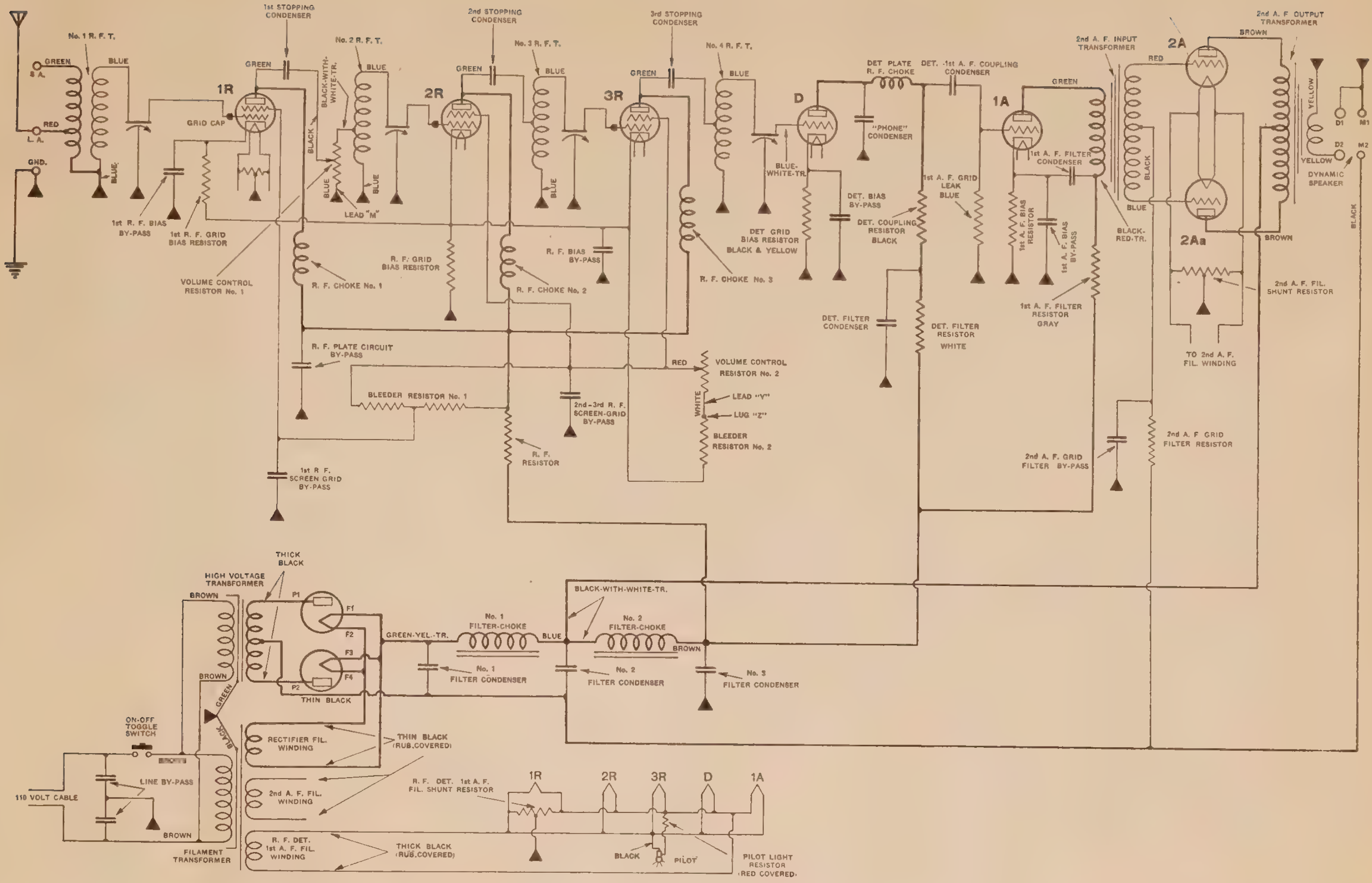

1st STOPPING CONDENSER
2nd STOPPING CONDENSER
3rd STOPPING CONDENSER
No. 1 R. F. T.
No. 2 R. F. T.
No. 3 R. F. T.
No. 4 R. F. T.
GREEN
BLUE
S. A.
RED
L. A.
GND.
1R
2R
3R
D
1A
2A
2Aa
GRID CAP
BLACK-WITH-WHITE-TR.
BLACK
LEAD "M"
1st R. F. BIAS BY-PASS
1st R. F. GRID BIAS RESISTOR
VOLUME CONTROL RESISTOR No. 1
R. F. CHOKE No. 1
R. F. GRID BIAS RESISTOR
R. F. BIAS BY-PASS
R. F. CHOKE No. 2
R. F. CHOKE No. 3
DET GRID BIAS RESISTOR BLACK & YELLOW
BLUE-WHITE-TR.
DET PLATE R. F. CHOKE
DET. -1st A. F. COUPLING CONDENSER
"PHONE" CONDENSER
DET. BIAS BY-PASS
DET. COUPLING RESISTOR BLACK
1st A. F. GRID LEAK BLUE
1st A. F. BIAS RESISTOR
1st A. F. BIAS BY-PASS
1st A. F. FILTER CONDENSER
1st A. F. FILTER RESISTOR GRAY
DET. FILTER CONDENSER
DET. FILTER RESISTOR WHITE
2nd A. F. INPUT TRANSFORMER
BLACK-RED-TR.
2nd A. F OUTPUT TRANSFORMER
BROWN
YELLOW
D1
M1
D2
M2
DYNAMIC SPEAKER
2nd A. F. FIL. SHUNT RESISTOR
TO 2nd A. F. FIL. WINDING
2nd A. F GRID FILTER RESISTOR
2nd A. F. GRID FILTER BY-PASS
R. F. PLATE CIRCUIT BY-PASS
BLEEDER RESISTOR No. 1
2nd-3rd R. F. SCREEN-GRID BY-PASS
R. F. RESISTOR
1st R F. SCREEN GRID BY-PASS
VOLUME CONTROL RESISTOR No. 2
WHITE
LEAD "Y"
LUG "Z"
BLEEDER RESISTOR No. 2
THICK BLACK
HIGH VOLTAGE TRANSFORMER
P1
P2
F1
F2
F3
F4
THIN BLACK
GREEN-YEL.-TR.
No. 1 FILTER-CHOKE
No. 2 FILTER-CHOKE
No. 1 FILTER CONDENSER
No. 2 FILTER CONDENSER
No. 3 FILTER CONDENSER
ON-OFF TOGGLE SWITCH
110 VOLT CABLE
LINE BY-PASS
FILAMENT TRANSFORMER
RECTIFIER FIL. WINDING
THIN BLACK (RUB.COVERED)
2nd A. F. FIL. WINDING
R. F. DET. 1st A. F. FIL. WINDING
THICK BLACK (RUB.COVERED)
R. F. DET. 1st A. F. FIL. SHUNT RESISTOR
PILOT
PILOT LIGHT RESISTOR (RED COVERED)

Fig. 147. Circuit of Model 66.

In some early Model 66, volume control resistor No. 1 is connected across the R. F. choke coil in the plate circuit of the 1st-R. F. tube. The slider of this resistor is connected to a tap on No. 2 R. F. T. through a coupling condenser.

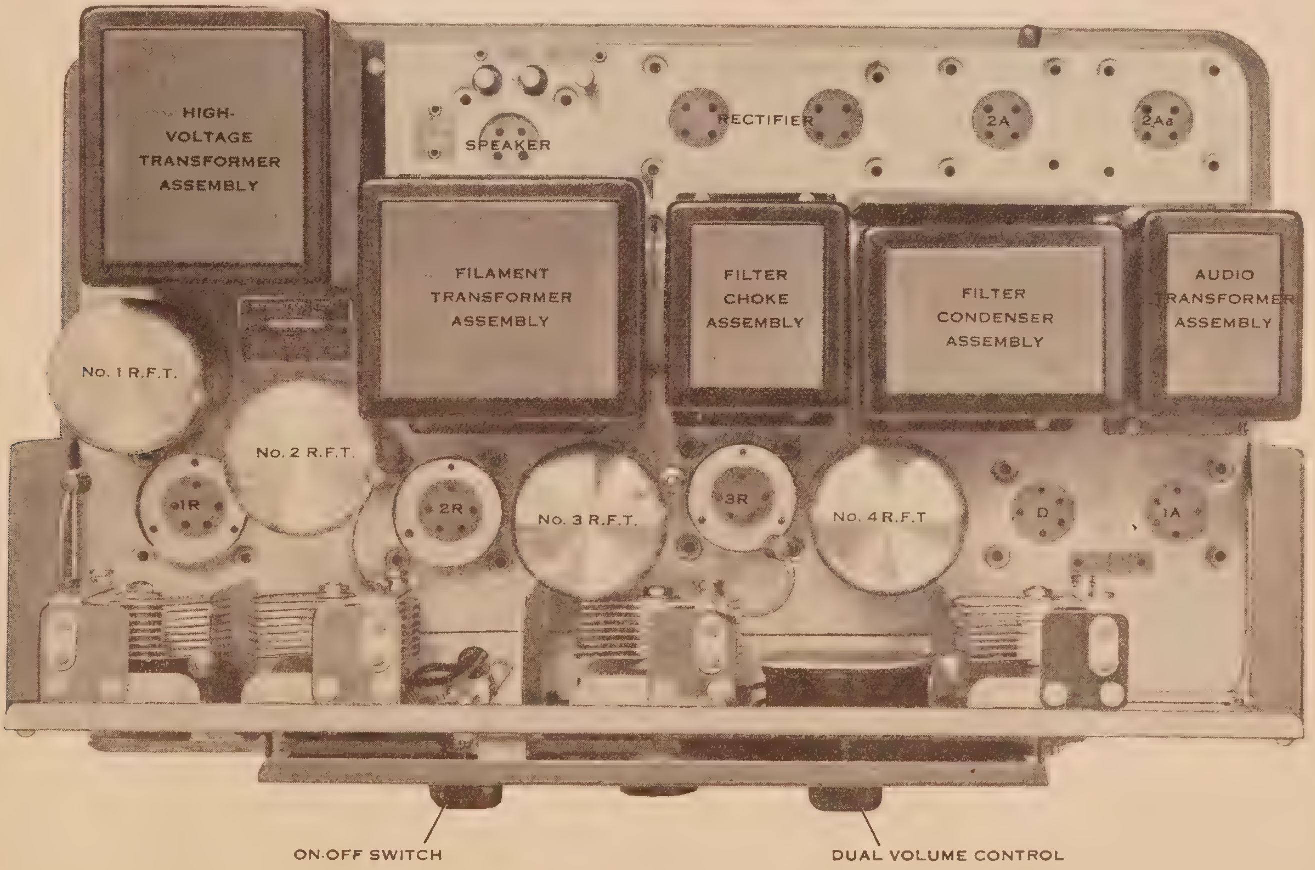

HIGH-VOLTAGE TRANSFORMER ASSEMBLY
SPEAKER
RECTIFIER
2A
2Aa
FILAMENT TRANSFORMER ASSEMBLY
FILTER CHOKE ASSEMBLY
FILTER CONDENSER ASSEMBLY
AUDIO TRANSFORMER ASSEMBLY
No. 1 R.F.T.
No. 2 R.F.T.
No. 3 R.F.T.
No. 4 R.F.T
1R
2R
3R
D
1A
ON-OFF SWITCH
DUAL VOLUME CONTROL

Fig. 148. Top View of Model 66.

MODEL 66

Connections of R. F. Coil Group No. 16985

The colors of the leads to chassis and to the variable condensers are in some cases different from those specified below.

No. 1 R. F. T.

Blue (1″) to chassis.
Blue (long) to stator No. 1 V.C.

Green to Short-Antenna.

Red to Long-Antenna.

No. 2 R. F. T.

Blue (1″) to chassis.
Blue (5″) to stator No. 2 V. C.

Green to P1R.

Black-with-white-tr., and plain black, connect to corresponding leads from volume control.

No. 3 R. F. T.

Blue (1″) to chassis.
Blue (5″) to stator No. 3 V. C.

Green to P2R.

No. 4 R. F. T.

Blue-white-tr. (1″) to chassis.
Blue-white-tr. (5″) (with lug), to stator No. 4 V.C.
Blue-white-tr. (without lug) from stator No. 4 V.C. to GD.
Green to P3R.

Condensers in R. F. By-pass No. 1

A—1st-R. F. bias by-pass.
E—1st-R. F. screen by-pass.
F—2nd-3rd-R. F. screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in R. F. By-pass No. 2

B—R. F. bias by-pass.
L—Line by-pass.
L—Line by-pass.
Y—2nd-A. F. grid-filter by-pass.

Condensers in Detector By-pass

D—Detector bias by-pass.
M—Detector-1st-A. F. coupling condenser.
P—"Phone" condenser.

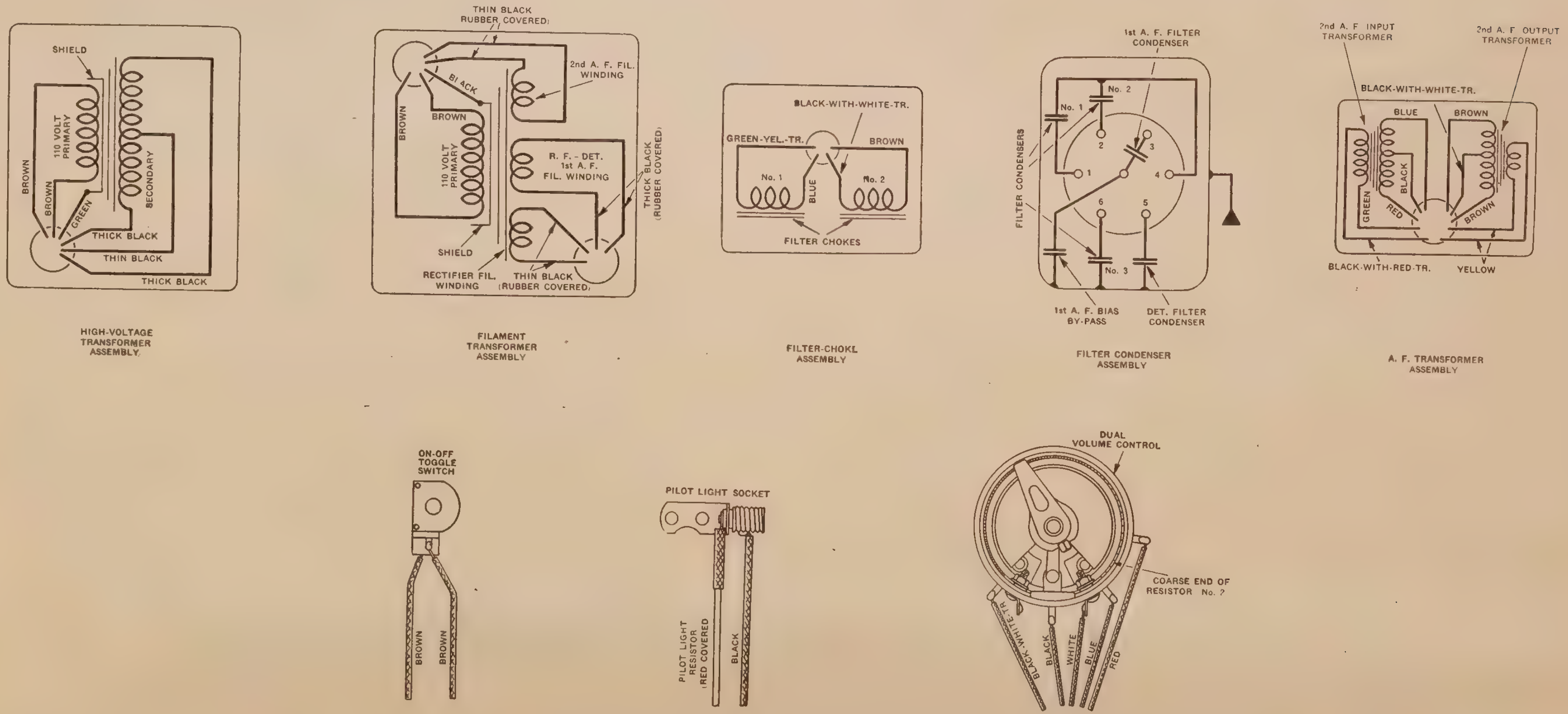

SHIELD
110 VOLT PRIMARY
SECONDARY
BROWN
BROWN
GREEN
THICK BLACK
THIN BLACK
THICK BLACK
HIGH-VOLTAGE TRANSFORMER ASSEMBLY
THIN BLACK RUBBER COVERED
2nd A. F. FIL. WINDING
BLACK
BROWN
BROWN
110 VOLT PRIMARY
R. F. - DET. 1st A. F. FIL. WINDING
THICK BLACK (RUBBER COVERED)
SHIELD
RECTIFIER FIL. WINDING
THIN BLACK (RUBBER COVERED)
FILAMENT TRANSFORMER ASSEMBLY
BLACK-WITH-WHITE-TR.
GREEN-YEL.-TR.
BROWN
No. 1
BLUE
No. 2
FILTER CHOKES
FILTER-CHOKE ASSEMBLY
1st A. F. FILTER CONDENSER
No. 1
No. 2
No. 3
FILTER CONDENSERS
1 2 3 4 5 6
1st A. F. BIAS BY-PASS
DET. FILTER CONDENSER
FILTER CONDENSER ASSEMBLY
2nd A. F. INPUT TRANSFORMER
2nd A. F. OUTPUT TRANSFORMER
BLACK-WITH-WHITE-TR.
BLUE
BROWN
GREEN
BLACK
RED
BROWN
BLACK-WITH-RED-TR.
YELLOW
A. F. TRANSFORMER ASSEMBLY
ON-OFF TOGGLE SWITCH
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (RED COVERED
BLACK
DUAL VOLUME CONTROL
COARSE END OF RESISTOR No. ?
BLACK-WHITE-TR.
BLACK
WHITE
BLUE
RED

Fig. 149. Connections of Units in Model 66.
A "quality" condenser, not shown above, is connected across the primary (large winding) of the 2nd-A. F. output transformer.

MODEL 66

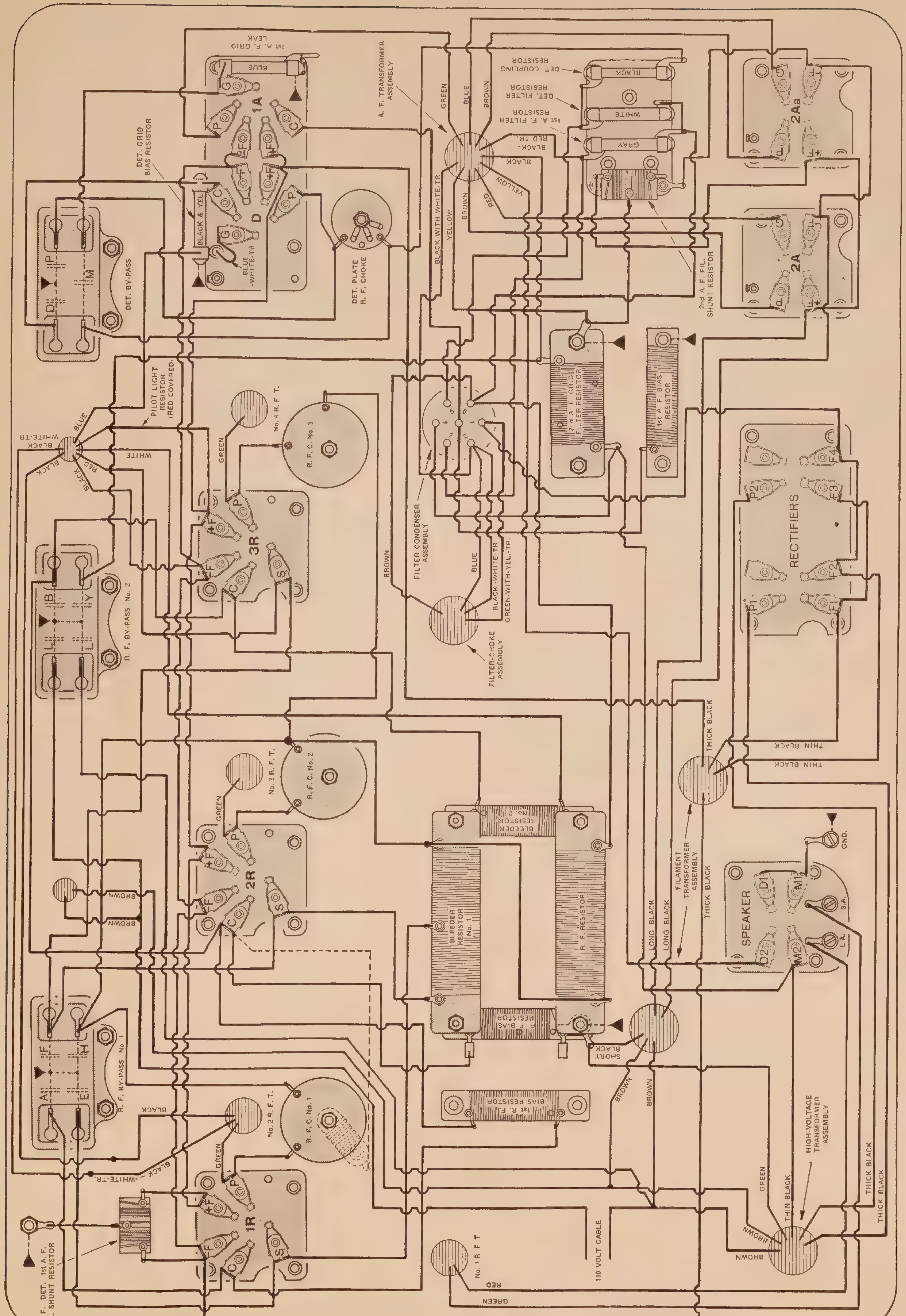

1st A. F. GRID LEAK
BLUE
G
P
C
1A
F
+F
D
DET. GRID BIAS RESISTOR
BLACK & YEL
BLUE -WHITE-TR
DET. BY-PASS
D
P
M
DET. PLATE R. F. CHOKE
A. F. TRANSFORMER ASSEMBLY
GREEN
BLUE
BROWN
BLACK-WITH WHITE-TR
YELLOW
BROWN
RED
YELLOW
BLACK
BLACK-RED TR
DET COUPLING RESISTOR
DET. FILTER RESISTOR
1st A. F. FILTER RESISTOR
BLACK
WHITE
GRAY
2Aa
2A
2nd A. F. FIL. SHUNT RESISTOR
PILOT LIGHT RESISTOR (RED COVERED)
BLUE
BLACK-WHITE-TR
WHITE
RED
BLACK
No. 4 R. F. T.
GREEN
R. F. C. No. 3
3R
S
R. F. BY-PASS No. 2
B
Y
L
FILTER CONDENSER ASSEMBLY
BROWN
BLUE
BLACK-WHITE-TR.
GREEN-WITH-YEL.-TR.
FILTER-CHOKE ASSEMBLY
2nd A. F. GRID FILTER RESISTOR
1st A. F. BIAS RESISTOR
RECTIFIERS
P1
P2
F1
F2
F3
F4
THICK BLACK
THIN BLACK
THIN BLACK
No. 3 R. F. T.
R. F. C. No. 2
GREEN
2R
BROWN
BROWN
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
R. F. RESISTOR
R. F. BIAS RESISTOR
SHORT BLACK
LONG BLACK
LONG BLACK
FILAMENT TRANSFORMER ASSEMBLY
THICK BLACK
SPEAKER
D1
D2
M1
M2
GND.
S.A.
L.A.
R. F. BY-PASS No. 1
A
E
F
H
BLACK
No. 2 R. F. T.
R. F. C. No. 1
GREEN
BLACK-WHITE-TR.
1R
1st R. F. BIAS RESISTOR
BROWN
BROWN
R. F. DET. 1st A. F. FIL. SHUNT RESISTOR
110 VOLT CABLE
No. 1 R F T
RED
GREEN
HIGH-VOLTAGE TRANSFORMER ASSEMBLY
THIN BLACK
GREEN
BROWN
BROWN
THICK BLACK
THICK BLACK

Fig. 150. Bottom Wiring of Later-Type Model 66.

The resistor shown in dotted lines is the old-style R. F. bias resistor. This is shown merely to indicate how the old-style R. F. bias resistor was connected. The 1st-R. F. bias resistor is mounted on top of the new-style R. F. bias resistor. The 1st-A. F. bias resistor is mounted under the 2nd-A. F. grid-filter resistor.

MODEL 67 AND 67-C

Voltage Readings on Atwater Kent Model 67, 67-C Receiver (Battery-Operated)

Use High Resistance D. C. Voltmeter (About 0-50-250).

	MEASURE ACROSS	APPROX. VOLTAGE		NO READING INDICATES‡
		Total "B" 150 V.	Total "B" 180 V.	
FILAMENT VOLTAGES	—F1R to +F1R.	3.3	3.3	Open 1st-R.F. filament resistor.
	—F2R to +F2R.	3.3	3.3	Open 2nd-R.F. filament resistor.
	—F3R to +F3R.	3.3	3.3	Open 3rd-R.F. filament resistor.
	—FD to +FD.	5.0	5.0	Open detector-A.F. filament resistor.
	—F1A to +F1A.	5.0	5.0	
	—F2A to +F2A.	5.0	5.0	
	—F2Aa to +F2Aa.	5.0	5.0	
PLATE VOLTAGES	—F1R to P1R.	110	135	Open primary No. 2 R.F.T., or open R.F.C. No. 1.*
	—F2R to P2R.	110	135	Open primary No. 3 R.F.T.*
	—F3R to P3R.	110	135	Open primary No. 4 R.F.T.*
	—FD to PD.	50	60	Open detector filter resistor, open primary No. 1 A.F.T., or open R.F.C. No. 2.
	—F1A to P1A.	55	65	Open primary of input transformer.
	—F2A to P2A.	150	180	Open primary of output transformer.
	—F2Aa to P2Aa.	150	180	
GRID VOLTAGES	—F1R to G1R.	1.5	1.5	Open secondary No. 1 R.F.T.
	—F2R to G2R.	1.5	1.5	Open secondary No. 2 R.F.T.
	—F3R to G3R.	2.5	2.5	Open secondary No. 3 R.F.T.
	—F1A to G1A.	4.5	4.5	Open secondary No. 1 A.F.T.
	—F2A to G2A.	45	45	Open secondary input A.F. transformer.
	—F2Aa to G2Aa.	45	45	
SCREEN VOLTAGES	—F1R to S1R.	30	45	Open connection in screen-grid or volume-control circuit.
	—F2R to S2R.	30	45	
	—F3R to S3R.	25	40	Open 3rd-R.F. screen-grid resistor.

* In later Model 67 and 67-C, the primaries of No. 2, 3 and 4 R.F.T. are replaced by R.F. choke coils mounted under the chassis.

‡ Low filament voltages may indicate a shorted filament by-pass.

Low grid, screen-grid, or plate voltages may indicate a shorted by-pass for the respective circuits.

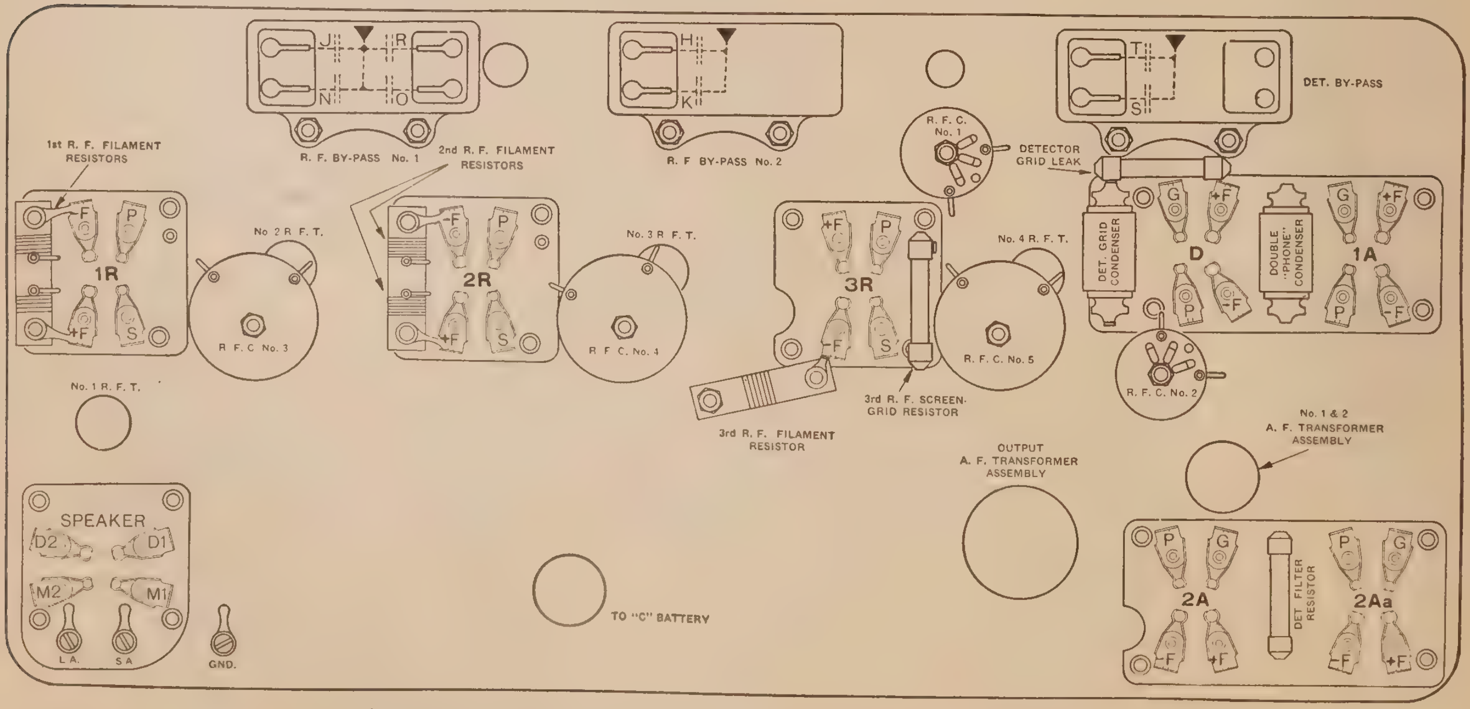

J
R
N
O
H
K
T
S
R. F. BY-PASS No. 1
R. F BY-PASS No. 2
DET. BY-PASS
1st R. F. FILAMENT RESISTORS
2nd R. F. FILAMENT RESISTORS
R. F. C. No. 1
DETECTOR GRID LEAK
-F
P
1R
+F
S
No 2 R F. T.
R F. C No. 3
-F
P
2R
+F
S
No. 3 R F. T.
R F C. No. 4
+F
P
3R
-F
S
No. 4 R. F. T.
R. F. C. No. 5
DET. GRID CONDENSER
G
+F
D
P
-F
DOUBLE "PHONE" CONDENSER
G
+F
1A
P
-F
R. F. C. No. 2
No. 1 R. F. T.
3rd R. F. FILAMENT RESISTOR
3rd R. F. SCREEN-GRID RESISTOR
OUTPUT A. F. TRANSFORMER ASSEMBLY
No. 1 & 2 A. F. TRANSFORMER ASSEMBLY
SPEAKER
D2
D1
M2
M1
L A.
S A
GND.
TO "C" BATTERY
P
G
2A
-F
+F
DET FILTER RESISTOR
P
G
2Aa
-F
+F

Fig. 151. Bottom Chart of Later-Type Model 67 and 67-C.

MODEL 67 AND 67-C

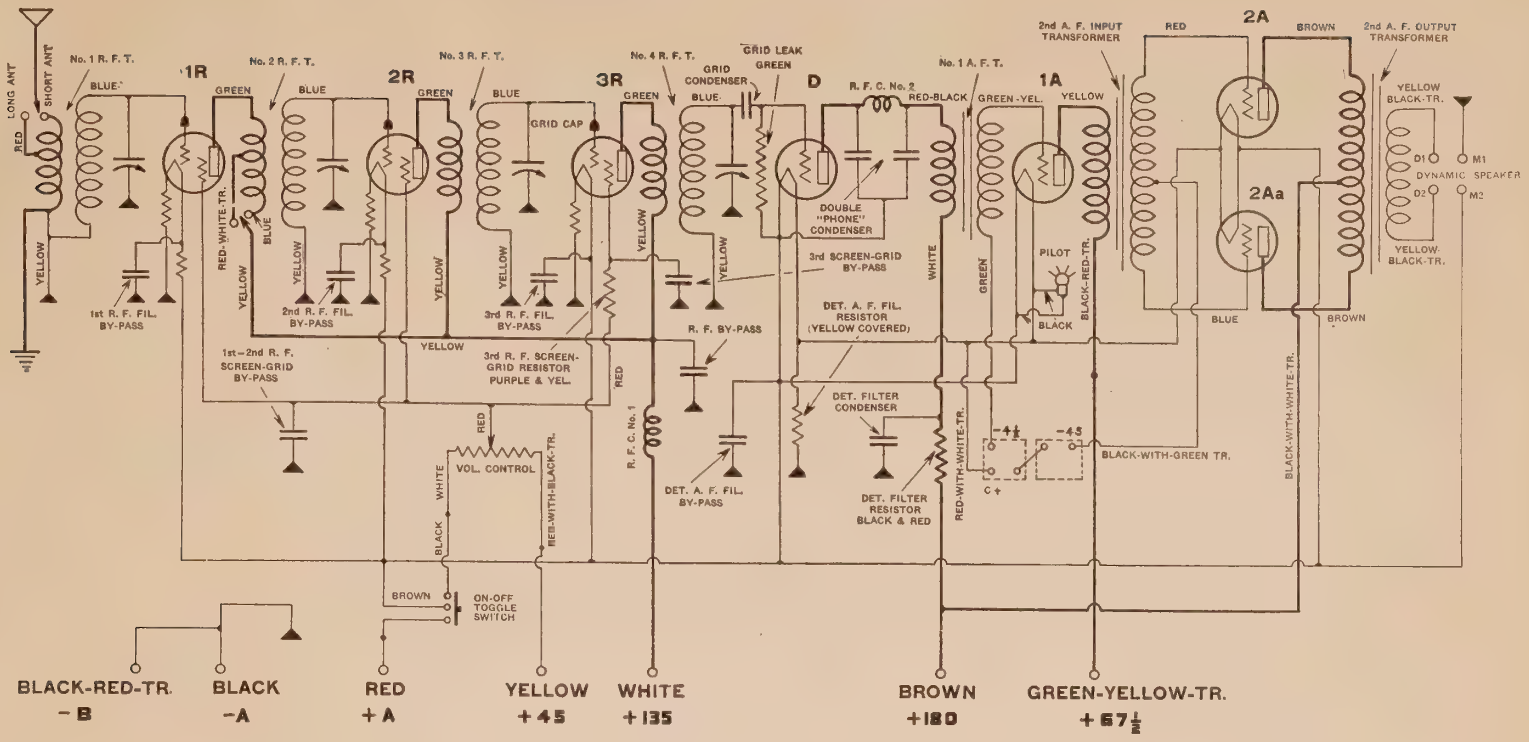

LONG ANT
SHORT ANT
RED
YELLOW
No. 1 R. F. T.
BLUE
1R
No. 2 R. F. T.
GREEN
BLUE
2R
No. 3 R. F. T.
GREEN
BLUE
GRID CAP
3R
No. 4 R. F. T.
GREEN
GRID CONDENSER
BLUE
GRID LEAK
GREEN
D
R. F. C. No. 2
RED-BLACK
No. 1 A. F. T.
GREEN-YEL.
1A
YELLOW
2nd A. F. INPUT TRANSFORMER
RED
2A
BROWN
2nd A. F. OUTPUT TRANSFORMER
YELLOW BLACK-TR.
D1
M1
DYNAMIC SPEAKER
D2
M2
2Aa
YELLOW BLACK-TR.
RED-WHITE-TR.
BLUE
YELLOW
YELLOW
YELLOW
YELLOW
YELLOW
1st R. F. FIL. BY-PASS
2nd R. F. FIL. BY-PASS
3rd R. F. FIL. BY-PASS
DOUBLE "PHONE" CONDENSER
3rd SCREEN-GRID BY-PASS
WHITE
GREEN
PILOT
BLACK-RED-TR.
BLACK
DET. A. F. FIL. RESISTOR (YELLOW COVERED)
BLUE
BROWN
R. F. BY-PASS
1st-2nd R. F. SCREEN-GRID BY-PASS
YELLOW
3rd R. F. SCREEN-GRID RESISTOR PURPLE & YEL.
RED
RED
R. F. C. No. 1
DET. FILTER CONDENSER
RED-WITH-WHITE-TR.
-4½
-45
C+
BLACK-WITH-GREEN TR.
BLACK-WITH-WHITE-TR.
VOL. CONTROL
WHITE
BLACK
RED-WITH-BLACK-TR.
DET. A. F. FIL. BY-PASS
DET. FILTER RESISTOR BLACK & RED
BROWN
ON-OFF TOGGLE SWITCH
BLACK-RED-TR. -B
BLACK -A
RED +A
YELLOW +45
WHITE +135
BROWN +180
GREEN-YELLOW-TR. +67½

Fig. 152. Diagram of Early Model 67 and 67-C (Battery Operated).

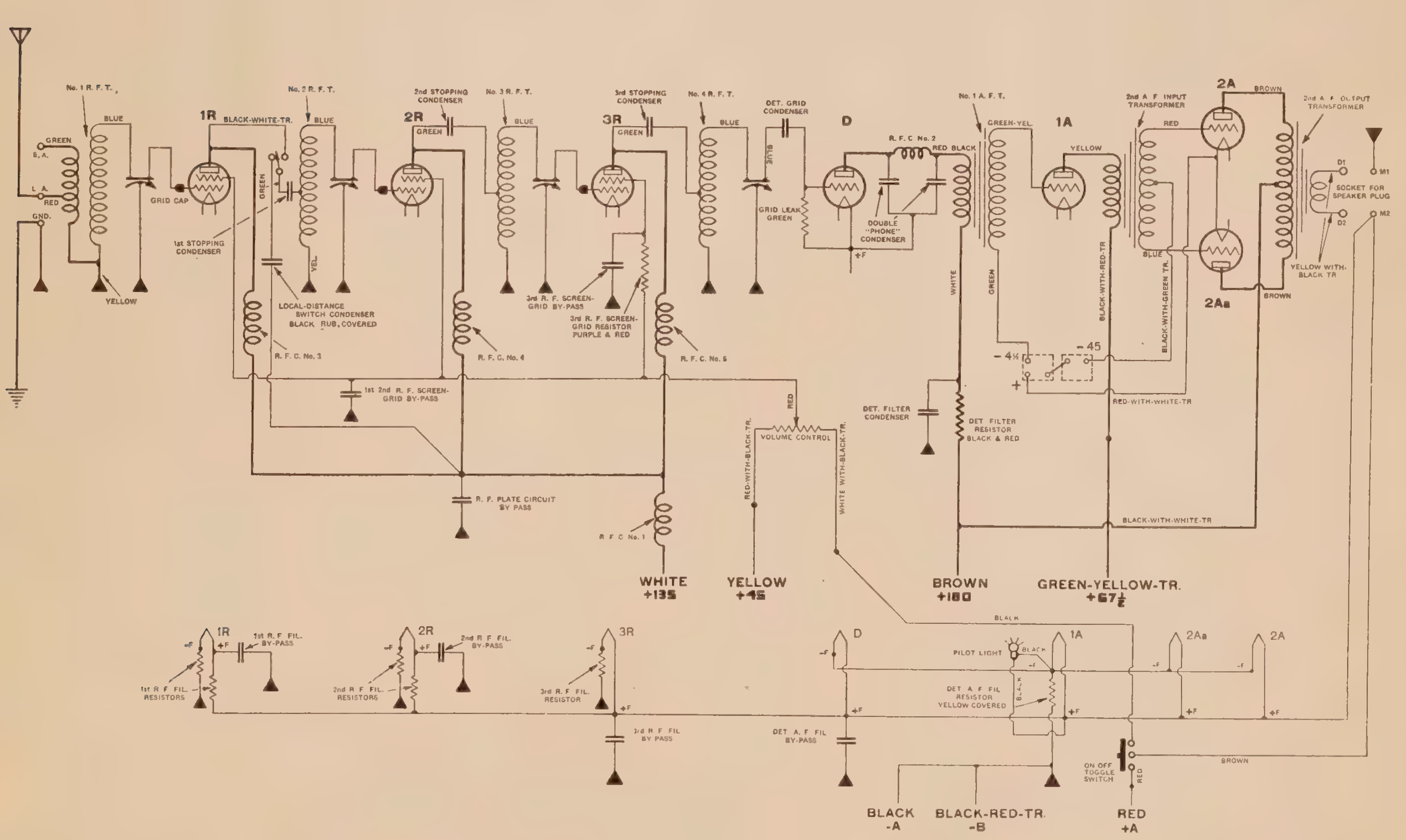

No. 1 R. F. T.
GREEN
S. A.
L. A.
RED
GND.
BLUE
1R
BLACK-WHITE-TR.
No. 2 R. F. T.
BLUE
GRID CAP
GREEN
YEL.
1st STOPPING CONDENSER
YELLOW
2nd STOPPING CONDENSER
2R
GREEN
No. 3 R. F. T.
BLUE
3rd STOPPING CONDENSER
3R
GREEN
No. 4 R. F. T.
BLUE
DET. GRID CONDENSER
D
GRID LEAK GREEN
R. F. C. No. 2
RED BLACK
DOUBLE "PHONE" CONDENSER
+F
No. 1 A. F. T.
GREEN-YEL.
1A
YELLOW
2nd A. F. INPUT TRANSFORMER
RED
2A
BROWN
2nd A. F. OUTPUT TRANSFORMER
D1
M1
SOCKET FOR SPEAKER PLUG
D2
M2
BLUE
2Aa
YELLOW WITH BLACK TR.
BROWN
LOCAL-DISTANCE SWITCH CONDENSER BLACK RUB. COVERED
R. F. C. No. 3
R. F. C. No. 4
3rd R. F. SCREEN-GRID BY-PASS
3rd R. F. SCREEN-GRID RESISTOR PURPLE & RED
R. F. C. No. 5
1st 2nd R. F. SCREEN-GRID BY-PASS
WHITE
GREEN
BLACK-WITH-RED TR.
BLACK-WITH-GREEN TR.
-4½
-45
+
RED-WITH-WHITE-TR.
DET. FILTER CONDENSER
DET. FILTER RESISTOR BLACK & RED
RED
VOLUME CONTROL
RED-WITH-BLACK TR.
WHITE WITH BLACK-TR.
R. F. PLATE CIRCUIT BY PASS
R F C No. 1
BLACK-WITH-WHITE-TR
WHITE +135
YELLOW +45
BROWN +180
GREEN-YELLOW-TR. +67½
BLACK
1R
1st R. F. FIL. BY-PASS
1st R. F. FIL. RESISTORS
2R
2nd R. F. FIL. BY-PASS
2nd R. F. FIL. RESISTORS
3R
3rd R. F. FIL. RESISTOR
3rd R. F. FIL. BY PASS
D
DET. A. F. FIL. BY-PASS
1A
PILOT LIGHT
BLACK
DET. A. F. FIL. RESISTOR YELLOW COVERED
2Aa
2A
-F
+F
ON OFF TOGGLE SWITCH
RED
BROWN
BLACK -A
BLACK-RED-TR. -B
RED +A

Fig. 153. Diagram of Later Model 67 and 67-C (Battery Operated).

MODEL 67 AND 67-C (Early Type)

Connections of R. F. Coil Group No. 16436

No. 1 R. F. T.

Yellow to chassis.
Blue to stator No. 1 V. C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

Yellow to chassis.
Blue (with lug) to stator No. 2 V. C.
Green to P1R.
Blue, and red-white to leads of corresponding colors from local-distance switch.

No. 3 R. F. T.

Yellow (1") to chassis.
Blue to stator No. 2 V. C.
Green to P2R.
Yellow to by-pass H.

No. 4 R. F. T.

Yellow (1") to chassis.
Blue (with lug) to stator No. 4 V. C.
Blue to grid condenser.
Green to P3R.
Yellow to R. F. C. No. 1.

Condensers in R. F. By-Pass No. 1

J—1st-2nd-R. F. screen by-pass.
N—1st-R. F. filament by-pass.
O—2nd-R. F. filament by-pass.
R—3rd-filament by-pass.

Condensers in R. F. By-Pass No. 2

K—3rd-R. F. screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in Detector By-Pass

S—Detector-A. F. filament by-pass.
T—Detector filter condenser.

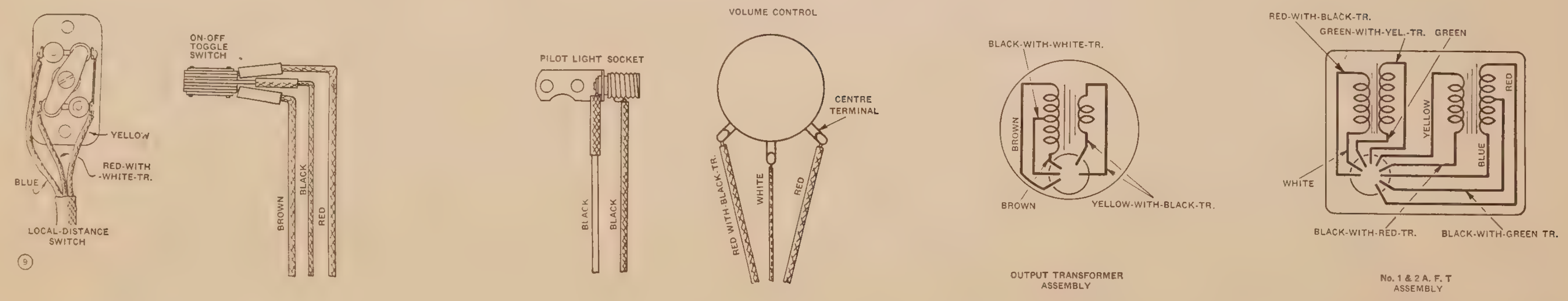

YELLOW
RED-WITH-WHITE-TR.
BLUE
LOCAL-DISTANCE SWITCH
⑨
ON-OFF TOGGLE SWITCH
BROWN
BLACK
RED
PILOT LIGHT SOCKET
BLACK
BLACK
VOLUME CONTROL
CENTRE TERMINAL
RED WITH BLACK-TR.
WHITE
RED
BLACK-WITH-WHITE-TR.
BROWN
BROWN
YELLOW-WITH-BLACK-TR.
OUTPUT TRANSFORMER ASSEMBLY
RED-WITH-BLACK-TR.
GREEN-WITH-YEL.-TR.
GREEN
YELLOW
RED
BLUE
WHITE
BLACK-WITH-RED-TR.
BLACK-WITH-GREEN TR.
No. 1 & 2 A. F. T ASSEMBLY

Fig. 154. Connections of Units in Early-Type Model 67 and 67-C.

MODEL 67 AND 67-C (Early Type)

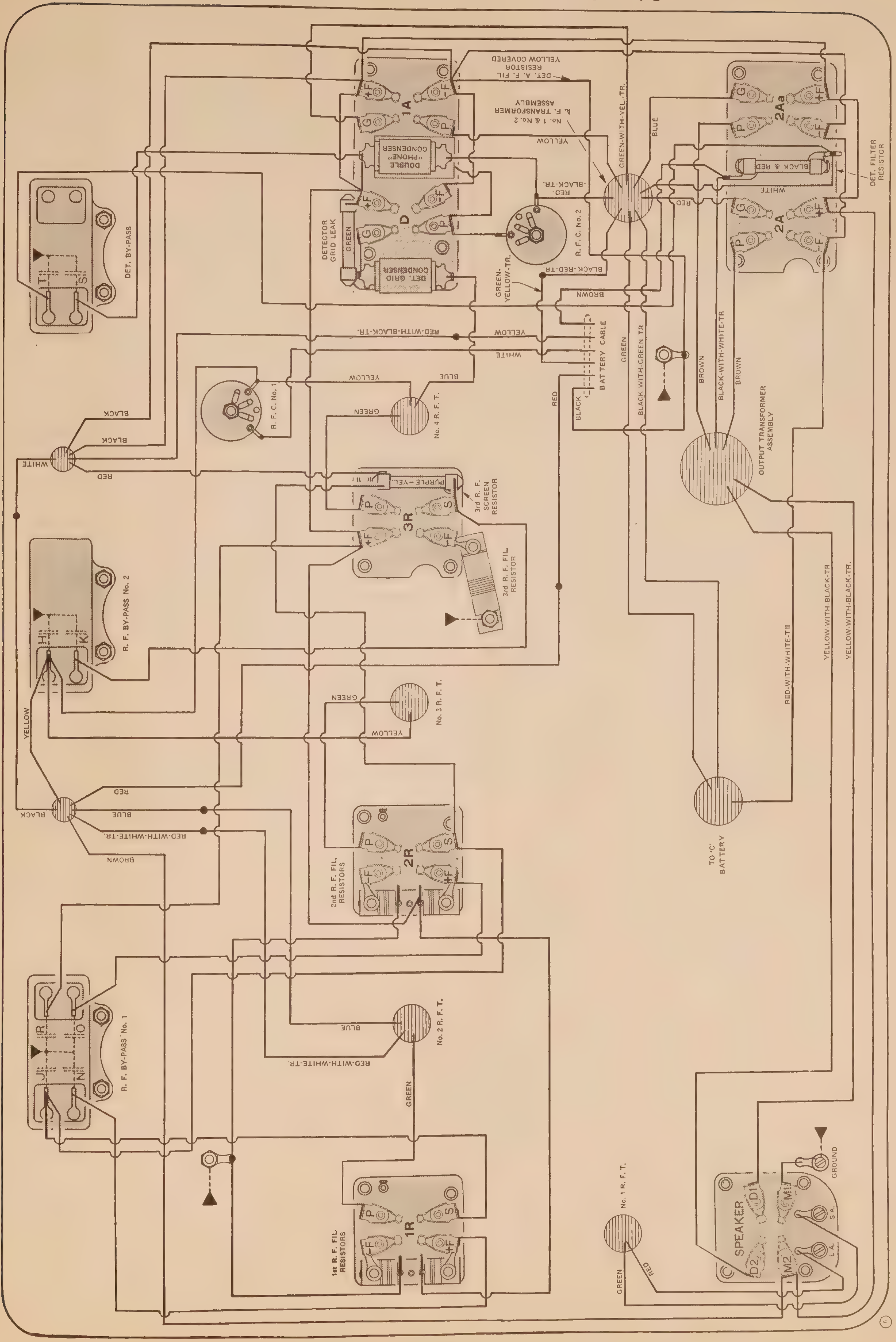

DET. A. F. FIL RESISTOR YELLOW COVERED
No. 1 & No. 2 A. F. TRANSFORMER ASSEMBLY
1A
+F
-F
G
P
DOUBLE "PHONE" CONDENSER
D
DET. GRID CONDENSER
DETECTOR GRID LEAK
GREEN
YELLOW
RED-BLACK-TR.
R. F. C. No. 2
BLACK-RED-TR.
GREEN-YELLOW-TR.
GREEN-WITH-YEL.-TR.
BLUE
RED
2Aa
2A
BLACK & RED
WHITE
DET. FILTER RESISTOR
DET. BY-PASS
T
S
BROWN
RED-WITH-BLACK-TR.
BATTERY CABLE
BLACK
BLACK-WITH-GREEN TR
BLACK-WITH-WHITE-TR
R. F. C. No. 1
No. 4 R. F. T.
OUTPUT TRANSFORMER ASSEMBLY
PURPLE-YEL.
3rd R. F. SCREEN RESISTOR
3R
3rd R. F. FIL RESISTOR
R. F. BY-PASS No. 2
H
K
No. 3 R. F. T.
RED-WITH-WHITE-TR
YELLOW-WITH-BLACK-TR
TO 'C' BATTERY
RED-WITH-WHITE-TR.
2R
2nd R. F. FIL RESISTORS
R. F. BY-PASS No. 1
R
O
J
N
No. 2 R. F. T.
1R
1st R. F. FIL RESISTORS
No. 1 R. F. T.
SPEAKER
D1
D2
M1
M2
GROUND
S. A.
L. A.
©

Fig. 155. Bottom Wiring of Early-Type Model 67 and 67-C.

MODEL 67 AND 67-C (Later Type)

Connections of R. F. Coil Group No. 17096

The colors of the leads to chassis and to the variable condensers are in some cases different from those specified below.

No. 1 R. F. T.

Yellow (1") to chassis.
Blue (long) to stator No. 1 V.C.
Green to Short-Antenna.
Red to Long-Antenna.

No. 2 R. F. T.

Yellow (1") to chassis.
Blue-white-tr. (5") to stator No. 2 V.C.
Green to green lead from local-distance switch. (The end of this green lead is stripped of insulation, but the strands of wire are NOT soldered.)

No. 3 R. F. T.

Blue-white-tr. (1") to chassis.
Blue (5") to stator No. 3 V.C.
Green to P2R. (The end of this green lead is stripped of insulation and the strands are soldered.)

No. 4 R. F. T.

Blue-white-tr. (1") to chassis.
Blue (5") to stator No. 4 V.C.
Blue (without lug) from stator of No. 4 V.C. to detector grid condenser.
Green to P3R.

Condensers in R. F. By-pass No. 1

J—1st-2nd-R. F. screen by-pass.
N—1st-R. F. filament by-pass.
O—2nd-R. F. filament by-pass.
R—3rd-R. F. filament by-pass.

Condensers in R. F. By-pass No. 2

K—3rd-R. F. screen by-pass.
H—R. F. plate-circuit by-pass.

Condensers in Detector By-pass

S—Detector-A. F. filament by-pass.
T—Detector filter condenser.

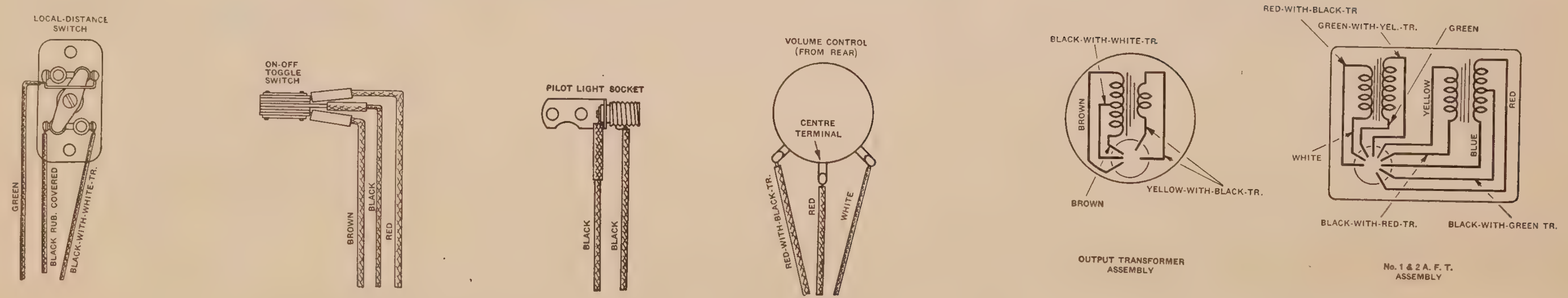

LOCAL-DISTANCE SWITCH
GREEN
BLACK RUB. COVERED
BLACK-WITH-WHITE-TR.
ON-OFF TOGGLE SWITCH
BROWN
BLACK
RED
PILOT LIGHT SOCKET
BLACK
BLACK
VOLUME CONTROL (FROM REAR)
CENTRE TERMINAL
RED-WITH-BLACK-TR.
RED
WHITE
BLACK-WITH-WHITE-TR.
BROWN
BROWN
YELLOW-WITH-BLACK-TR.
OUTPUT TRANSFORMER ASSEMBLY
RED-WITH-BLACK-TR
GREEN-WITH-YEL.-TR.
GREEN
YELLOW
RED
BLUE
WHITE
BLACK-WITH-RED-TR.
BLACK-WITH-GREEN TR.
No. 1 & 2 A. F. T. ASSEMBLY

Fig. 156. Connections of Units in Model 67 and 67-C.

MODEL 67 AND 67-C (Later Type)

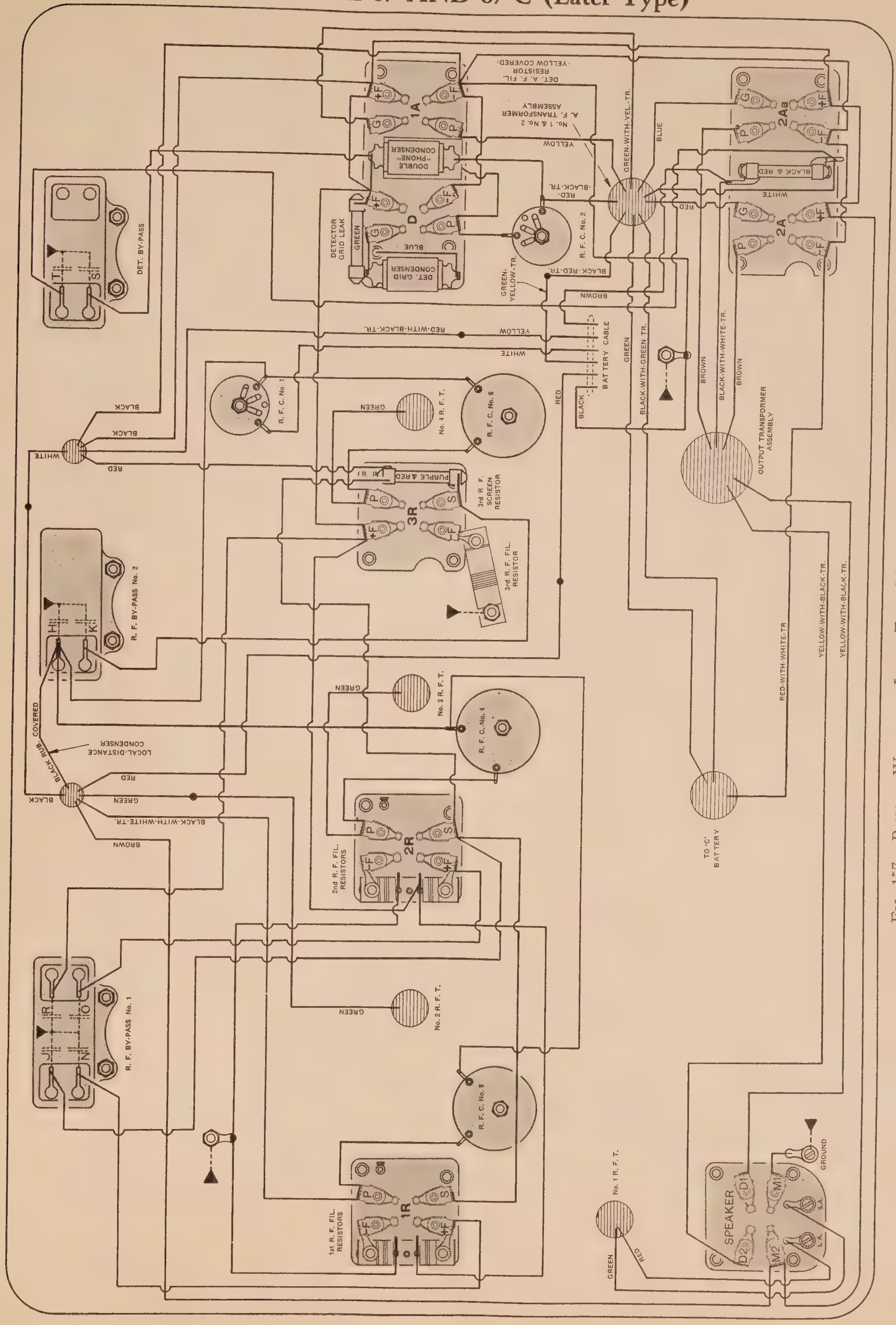

DET. A. F. FIL. RESISTOR (YELLOW COVERED)
1A
DOUBLE "PHONE" CONDENSER
No. 1 & No. 2 A. F. TRANSFORMER ASSEMBLY
YELLOW
GREEN-WITH-YEL.-TR.
BLUE
2Aa
BLACK & RED
WHITE
RED-BLACK-TR.
RED
2A
D
DETECTOR GRID LEAK
GREEN
BLUE
DET. GRID CONDENSER
R. F. C. No. 2
BLACK-RED-TR.
GREEN-YELLOW-TR.
BROWN
DET. BY-PASS
RED-WITH-BLACK-TR.
YELLOW
WHITE
BATTERY CABLE
GREEN
BLACK-WITH-GREEN TR.
BLACK
BLACK-WITH-WHITE-TR.
R. F. C. No. 1
GREEN
No. 4 R. F. T.
R. F. C. No. 5
OUTPUT TRANSFORMER ASSEMBLY
BLACK
WHITE
RED
PURPLE & RED
3R
3rd R. F. SCREEN RESISTOR
3rd R. F. FIL. RESISTOR
R. F. BY-PASS No. 2
H
K
RED-WITH-WHITE-TR.
YELLOW-WITH-BLACK-TR.
YELLOW-WITH-BLACK-TR.
GREEN
No. 3 R. F. T.
R. F. C. No. 4
BLACK RUB. COVERED
LOCAL-DISTANCE CONDENSER
RED
BLACK
GREEN
BLACK-WITH-WHITE-TR.
BROWN
TO "C" BATTERY
2R
2nd R. F. FIL. RESISTORS
GREEN
No. 2 R. F. T.
R. F. BY-PASS No. 1
R. F. C. No. 8
1R
1st R. F. FIL. RESISTORS
No. 1 R. F. T.
GREEN
RED
SPEAKER
D1
D2
M1
M2
GROUND
S.A.
L.A.
G
P
+F
-F
S

FIG. 157. BOTTOM WIRING OF LATER-TYPE MODEL 67 AND 67-C.
A black-with-red-tracer lead, connected to the end of the black cable lead, is for connection to —B.

VOLTAGE TABLE FOR MODEL 41

All Measurements Made While Set Is in Operation
Use high-resistance D. C. Voltmeter

	APPROXIMATE VOLTAGE
Voltage at Power Unit Panel Assembly.	
—A to +A.	35 V.
—A to +B, R.F.-1st A.F.	90 V.
—A to +B, Detector.	60 V.
—A to Output No. 1.	95 V.
—A to Output No. 2.	95 V.
Filament Voltage at Set.*	
—F1R to +F1R (1st R.F. Filament).	4.8 V.
—F2R to +F2R (2nd R.F. Filament).	4.9 V.
—F3R to +F3R (3rd R.F. Filament).	4.6 V.
—FD to +FD (Detector Filament).	4.6 V.
—F1A to +F1A (1st A.F. Filament).	4.9 V.
—F2A to +F2A (2nd A.F. Filament).	4.8 V.
Grid Bias at Set.*	
—F1R to G1R (1st R.F. Bias).	2 V.
—F1A to G1A (1st A.F. Bias).	4.8 V.
—F2A to G2A (2nd A.F. Bias).	9.7 V.
Plate Voltage at Set.*	
—F1R to P1R (1st R.F. Plate).	60 V.
—F2R to P2R (2nd R.F. Plate).	65 V.
—F3R to P3R (3rd R.F. Plate).	65 V.
—FD to PD (Detector Plate).	24 V.
—F1A to P1A (1st A.F. Plate).	81 V.
—F2A to P2A (2nd A.F. Plate).	81 V.
Voltage at 2nd A.F. Tube on Power Unit.*	
—F to +F (Filament Voltage).	4.8 V.
—F to G (Grid Bias Voltage).	9.7 V.
—F to P (Plate Voltage).	85 V.

* Contact made through socket eyelets.

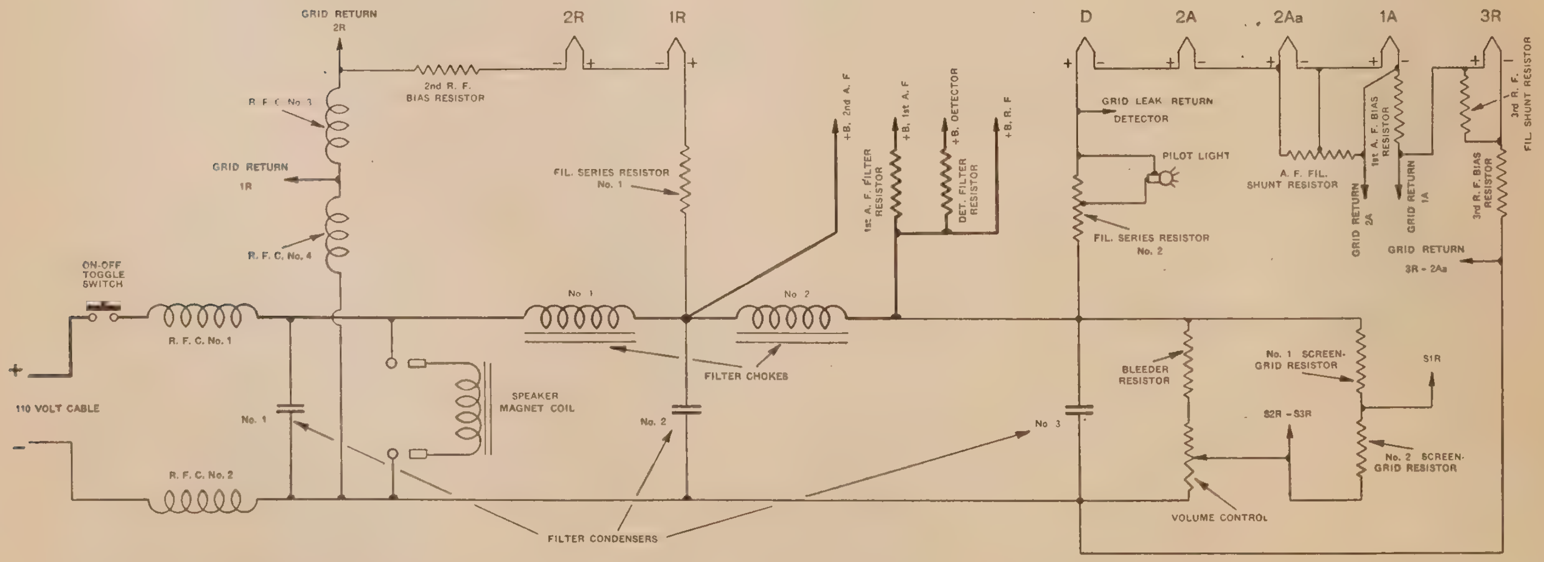

GRID RETURN 2R
2R
1R
2nd R. F. BIAS RESISTOR
R. F. C. No. 3
GRID RETURN 1R
R. F. C. No. 4
FIL. SERIES RESISTOR No. 1
ON-OFF TOGGLE SWITCH
R. F. C. No. 1
No. 1
No. 2
+
110 VOLT CABLE
−
No. 1
SPEAKER MAGNET COIL
FILTER CHOKES
No. 2
R. F. C. No. 2
FILTER CONDENSERS
+B, 2nd A. F
+B, 1st A. F
+B, DETECTOR
+B, R. F
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
D
2A
2Aa
1A
3R
GRID LEAK RETURN DETECTOR
PILOT LIGHT
FIL. SERIES RESISTOR No. 2
A. F. FIL. SHUNT RESISTOR
1st A. F. BIAS RESISTOR
GRID RETURN 2A
GRID RETURN 1A
3rd R. F. FIL. SHUNT RESISTOR
3rd R. F. BIAS RESISTOR
GRID RETURN 3R - 2Aa
No 3
BLEEDER RESISTOR
No. 1 SCREEN-GRID RESISTOR
S1R
S2R - S3R
No. 2 SCREEN-GRID RESISTOR
VOLUME CONTROL

Fig. 158. Simplified Diagram of Power Unit and Filament Circuit in Model 61 and 61-C.
The grid bias voltage of any one tube is secured by bringing the grid-return lead of the tube to a point in the filament circuit which has the correct negative voltage with respect to the negative filament terminal of the same tube.

MISCELLANEOUS DATA

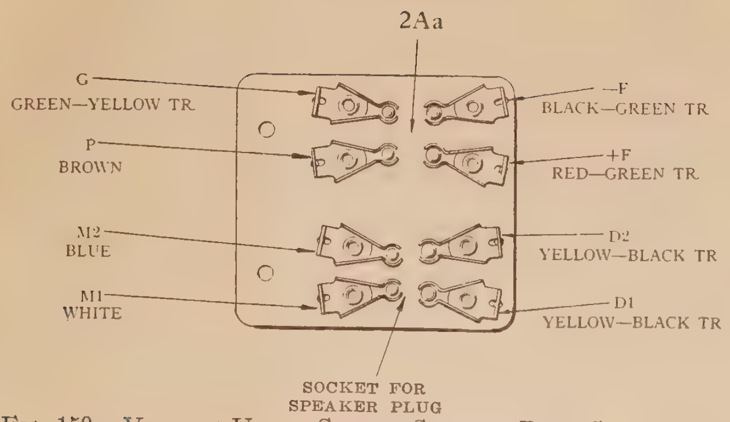

2Aa
G
GREEN—YELLOW TR
P
BROWN
M2
BLUE
M1
WHITE
—F
BLACK—GREEN TR
+F
RED—GREEN TR
D2
YELLOW—BLACK TR
D1
YELLOW—BLACK TR
SOCKET FOR
SPEAKER PLUG

Fig. 159. View of Under-Side of Speaker-Plug Socket and Socket 2Aa on Model 43, 46, 47 and 53.

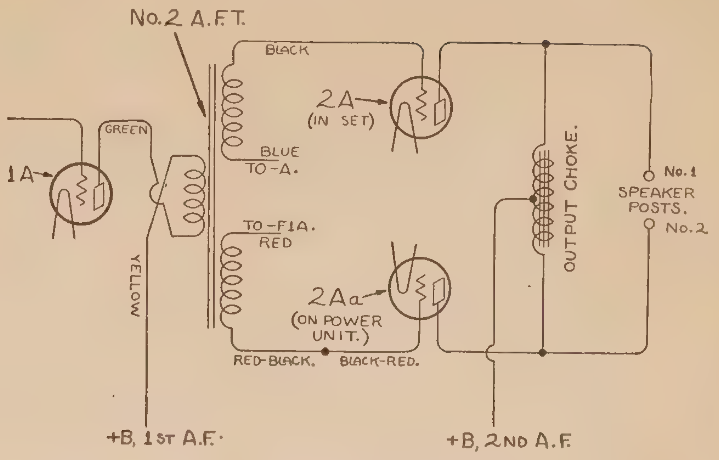

No.2 A.F.T.
BLACK
GREEN
1A
2A
(IN SET)
BLUE
TO-A.
TO-F1A.
RED
YELLOW
2Aa
(ON POWER UNIT.)
RED-BLACK.
BLACK-RED.
OUTPUT CHOKE.
No.1
SPEAKER POSTS.
No.2
+B, 1st A.F.
+B, 2nd A.F.

Fig. 160. Schematic Diagram of the "Double Audio" 2nd-A. F. Stage in Model 41.

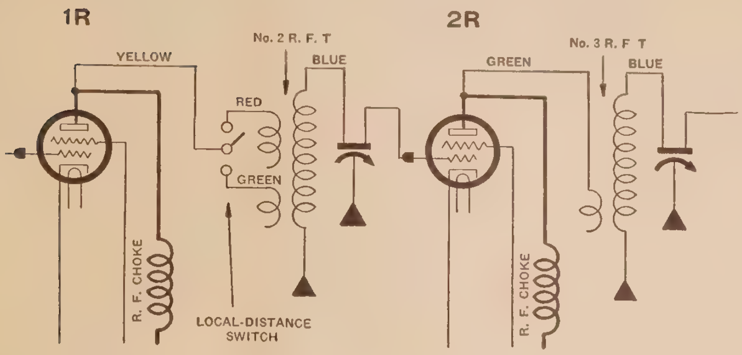

1R
YELLOW
No. 2 R. F. T
BLUE
RED
GREEN
R. F. CHOKE
LOCAL-DISTANCE
SWITCH
2R
GREEN
No. 3 R. F. T
BLUE
R. F. CHOKE

Fig. 161. First Type of Auto-Transformers for Model 55 and 55-C.

In this type of coil, the primary, with only one connection, acts as a stopping condenser to the secondary.

This type of R. F. coil group is no longer supplied for replacement, being superseded by the type shown in the diagrams of later Models.

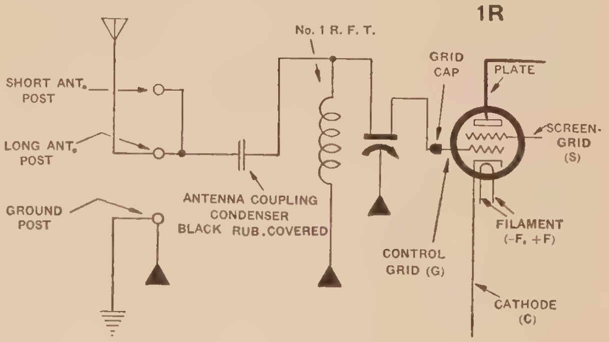

No. 1 R. F. T.
1R
SHORT ANT.
POST
LONG ANT.
POST
GROUND
POST
ANTENNA COUPLING
CONDENSER
BLACK RUB. COVERED
GRID
CAP
PLATE
SCREEN-
GRID
(S)
FILAMENT
(-F, +F)
CONTROL
GRID (G)
CATHODE
(C)

Fig. 162. Connections for Capacity-Coupled Type No. 1 R. F. T. Which is Used in Some Later-Type Models.

The long-antenna and short-antenna binding posts are connected together when this type of coil is used.

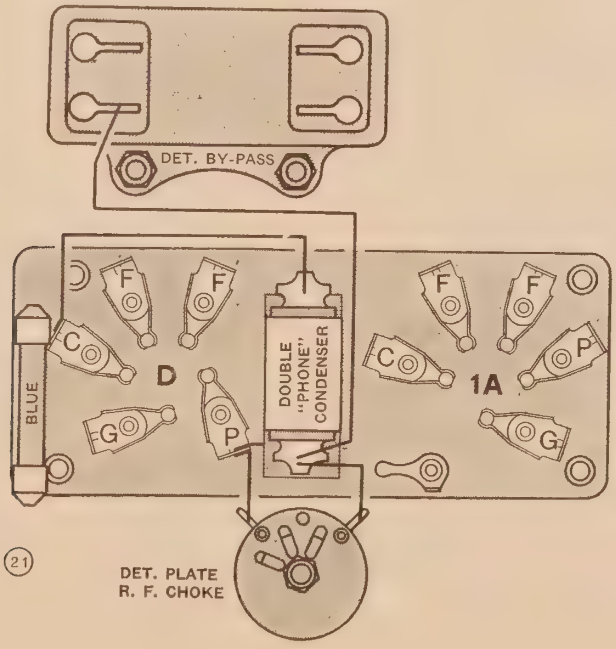

DET. BY-PASS
F
F
C
D
G
P
BLUE
DOUBLE
"PHONE"
CONDENSER
F
F
C
P
1A
G
21
DET. PLATE
R. F. CHOKE

Fig. 163. Connections of Double-Type Phone Condenser in Early Model 55.

REPLACING VOLUME CONTROL CONTACT

(To Correct Noisy Volume Control)

General Information

A special type of volume control contact, Part No. 14857 (Fig. 164), was developed to eliminate the possibility of noisy operation. Extensive tests have shown that this slider provides quiet, smooth control when correctly installed. The new slider superseded the original types, which are now obsolete.

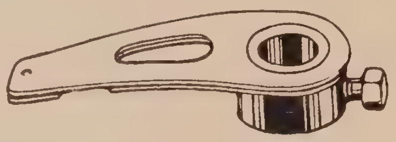


FIG. 164. LATER-TYPE SLIDER, OR CONTACT SPRING, FOR VOLUME CONTROL. PART NO. 14857.
The bottom spring is the "contact shoe." The top spring is the "pressure arm."

The principle of the new slider is somewhat like that of the third-rail contact-shoe on electric trains, pressure being applied to the contact-shoe through a central point, allowing the shoe to pivot at this point and ride over obstructions without losing contact with the resistance wire.

Method of Installation

It is necessary to place the collar of the slider on the control shaft at a point that brings the contact-shoe at right angles to the resistance unit, so that the entire contacting surface of the shoe will rest flat on the edge of the resistance strip. A simple jig is available (Fig. 165) for the purpose of setting the slider at the correct point on the shaft, and in order to obtain the proper results from the later-type slider it is necessary to use this jig, which may be purchased through Atwater Kent distributors.

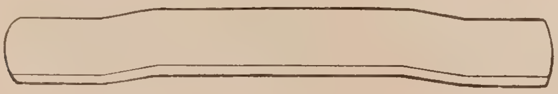


FIG. 165. VIEW OF JIG FOR SETTING COLLAR OF SLIDER AT CORRECT POSITION ON CONTROL SHAFT.
The concaved or hollow side of the jig is placed facing toward the volume control. The jig is Part No. 15115.

Fig. 167 shows the material and steps required for installation of the slider. Detailed instructions for this procedure follow:

1. Remove chassis from cabinet, unscrew the volume control from metal frame, and take off the old slider. Thoroughly clean off the resistance unit, the shaft, the slider, the shaft-connection spring and the edge of the hole in the shaft-connection spring with a clean rag dipped in alcohol. Spread a light film of Nujol (mineral oil) on these parts. **Do not use any type of oil other than Nujol.** This mineral oil may be obtained in any drug store.

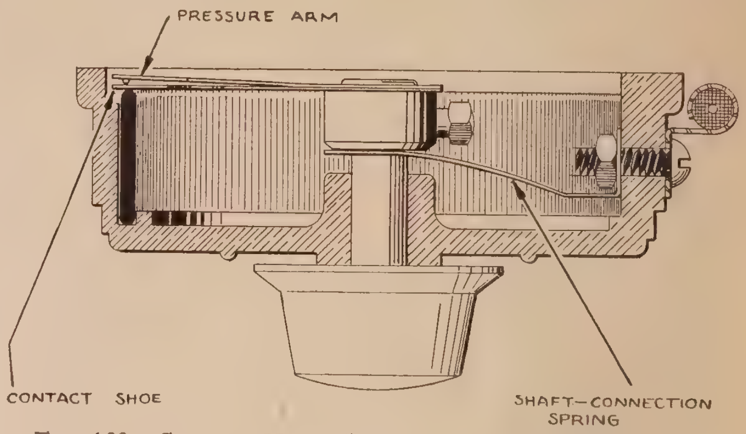
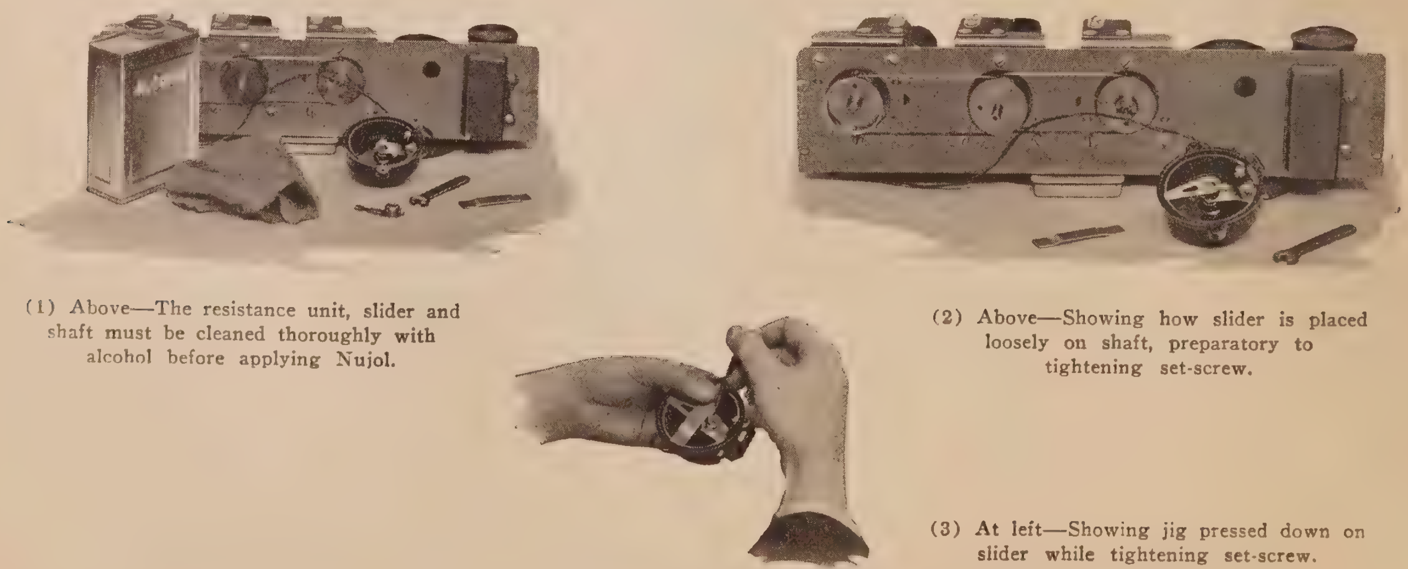


FIG. 166. SECTION VIEW SHOWING CORRECT POSITION FOR INSTALLATION OF NEW-TYPE SLIDER.
The contact shoe must be at right angles to the resistance strip.

2. Place slider on the shaft in such a way that the spring points toward the centre of the resistance strip. Turn the control knob until the arrow indicator is in the correct position with respect to the control springs, and so that it will be in the correct position with reference to volume control panel when at minimum and maximum volume positions.

3. Press the control knob in against the housing, and push down the slider with the jig (Fig. 165) until the flat ends of the jig are resting flat on the wire-wound part of the resistance strip. Tighten the set screw, remove jig, and then replace volume control unit on receiver. (The concaved or hollow side of the jig must be placed facing toward the volume control.)



(1) Above—The resistance unit, slider and shaft must be cleaned thoroughly with alcohol before applying Nujol.

(2) Above—Showing how slider is placed loosely on shaft, preparatory to tightening set-screw.

(3) At left—Showing jig pressed down on slider while tightening set-screw.

FIG. 167. STEPS IN INSTALLATION OF LATER-TYPE VOLUME CONTROL CONTACT ARM.

Volume Controls (Continued)

If after the set has been in service for a period of time a sudden increase of volume is experienced at a certain point or points on the volume control, it is probable that a bit of insulating substance is caught on top of the resistance unit, causing the slider to lose contact with the resistance wire at this point. The remedy is to scrape the contact-edge of the resistance unit at this spot, and at any other points that appear to be coated with dirt or oxide. Then clean off the resistance unit, the slider, the shaft, and the hole in the shaft-connection spring with a clean rag dipped in alcohol. Spread a light film of Nujol on these parts. **It is absolutely essential not to use any type of oil other than Nujol.** Other oils may give satisfactory results for a few days or a few weeks, but, owing to their acid content, they will eventually cause more harm than good. The purpose of the oil is not to lubricate, but to prevent the contact-edge of the resistance unit from being coated with oxide. Use only a slight amount of Nujol, and do not squirt it through the hole in the chassis. Always clean the control with alcohol before applying Nujol.

Bend up the shaft-connection spring (Fig. 166) to afford better contact. Move the slider back and forth a few times to scrape off any loose particles of dirt. If the control is still noisy at certain points, remove the control and scrape off the contact-edge of the resistance unit.

Slight noises in the volume control may frequently be cleared up by turning the knob back and forth a few times to clean the edge of the resistance unit. This action may be necessary on volume controls which have not been used for a few weeks or months. Owners who complain of noisy volume controls (in which the new-type slider is installed as per previous instructions) may be advised of this point.

USE OF POWER TUBES IN BATTERY TYPE SETS

The following battery type sets were designed to permit the use of a power tube without change:

Model 20 Compact, No. 7960 (Serial Nos. 400,001 up).

Model 30 No. 8000 (later type).

Model 35.

Model 32.

Model 33.

Model 48.

Model 49.

Model 50.

Instructions are given below for changing the various earlier models of battery type sets so that a power tube can be used in the last audio socket:

Model 20 Compact, No. 7570 (Serial Nos. 200,000 to 395,766).

Model 30, No. 8000 (early type)

Remove chassis from cabinet and invert, exposing wiring under audio (3 tube) unit. Locate grid return wire leading from second audio transformer to blue wire of cable, and unsolder it from blue wire. Attach an additional short length (6 or 8 inches) of insulated wire to this lead from transformer, and bring this wire out through back of cabinet. This is the connection for the negative of "C" battery used for power tube. (We suggest using the "112A" type of power tube with a 4½-volt "C" battery.) Connect positive of "C" battery to negative "A" battery terminal. Lastly, connect positive (black and red) terminal of speaker direct to 135-volt positive terminal of "B" batteries or "B" power unit, **instead of** to usual speaker post on set.

Model 20, No. 4640 (large cabinet), Model 19 and Model 24

Remove set from cabinet and invert. Locate grid return (red wire) which runs from second audio transformer to black wire leading from rheostat to post "Minus A." Unsolder this one red wire (there are two) from black lead, solder an 8-inch length of insulated wire to end of red wire, and bring this lead out for connection to negative of "C" battery. Connect positive of "C" battery to "Minus A" post of set. Apply 135 volts to power tube, by connecting positive speaker terminal direct to 135-volt terminal of "B" batteries or other "B" voltage supply.

Open Type Sets (Mounted on Board)

Remove cover from 3-tube unit and locate secondary wire from second (right-hand) audio transformer. This wire emerges from sealing compound in base of unit and is soldered to bolt head of post "Minus A." Remove this wire from this bolt, solder a separate length of insulated wire to it, and bring this lead out through ventilating hole in cover, to be connected to negative of "C" battery required by power tube. Connect positive of "C" battery to "Minus A" post of 3-tube unit.

Connect 135-volt terminal of "B" batteries or "B" Power Unit, as described above for cabinet sets, direct to positive speaker cord terminal. Power tube is placed in last audio socket (right hand of two front tubes in 3-tube unit.)

Note—Where dry batteries are used for "B" power, we suggest the "112A" type of power tube, 135 volts total "B" and from 4½ to 9 volts "C" battery. Where storage "B" batteries or a good "B" power unit is used, the "171A" type power tube may be used. This tube gives perhaps a little better quality than the "112A" type, but consumes too much current to be economical when dry "B" batteries are used.

ADJUSTING TENSION OF CONDENSER BELTS IN ATWATER KENT RECEIVERS

On Atwater Kent "belted" receiving sets the variable condenser to which the dial is attached (termed the "dial-condenser") is held in a fixed position by three screws.

Each of the other variable condensers is arranged in such a way that when its three screws are loosened, it may be moved independently a fraction of an inch toward or away from the dial-condenser, thus loosening or tightening one belt. When the condenser has been moved to the point giving the correct belt tension the three screws holding the condenser are carefully tightened.

The service man should carefully estimate the tension of belts on sets that have been adjusted at the factory, and then endeavor to secure the same tension on all belts that he may adjust.

PULLEYS

Put dial-condenser pulley on the shaft of dial-condenser, with hollow side of the pulley facing set. This pulley has two short "pins" on its outside surface. Turn pulley so the **outer** one of the two pins is exactly on top. Hold pulley in this position and move rotary plates of the dial-condenser all the way inside the stationary plates. Then, with the pulley and condenser in this position, carefully tighten the two set-screws in the pulley. Make sure these screws are tight. The pulley should not be pushed in too far on the condenser shaft or the belt will rub against the set.

The pulleys on the shafts of all variable condensers (except the dial-condenser pulley) must turn freely or difficulty will be experienced in synchronizing the condensers. Twirl each pulley to see if it moves freely. If it does not move easily, rub the condenser shaft and pulley-bearing free from dirt and try again. If the pulley sticks, replace it or smooth off the condenser shaft with a fine grade of emery cloth. Also remove any burrs from the ends of the pulley bearing.

Do not proceed further until the pulleys turn easily. If the difficulty is caused by a damaged condenser shaft, replace the group of condensers.

BELTS

Each belt must be arranged with the eyelets (that clamp the two ends of the belt together) at the bottom of the belt loop. Each belt has two small holes, one to fit over one of the pins on the dial-condenser pulley and the other hole to fit over the pin on the pulley which that belt controls.

Loosen screws in the outer condensers and move them toward the dial-condenser so the belts will fit easily over the pulleys. In moving condensers, hold them by the heavy frame of the stator plates. Never place any strain on the pulley, shaft, or rotary plates of the condenser.

ADJUSTING BELT TENSION

Preliminary Procedure

(a) See that the three screws holding dial-condenser to chassis are tight, and that the three screws in each of the other variable condensers are slightly loosened. Note that the holes through which these latter screws pass are slotted, allowing the condenser to be moved horizontally a fraction of an inch toward or away from the dial-condenser. Two pins projecting from the front of the condenser fit into two horizontal slots and serve to keep the condenser properly aligned. Be certain that the condenser pins are in the slots and not jammed outside. (Model 30 (early type) and 32 have moulded end-plate variable condensers and these do not have the projecting pins.)

(b) In Atwater Kent "belted" receivers having metal frame variable condensers, a hole is provided in the front of the chassis at the edge of each condenser. The hole is placed on that side of the condenser which is nearest to the dial-condenser. The frame of the condenser partly covers the hole. By inserting the blade of a screw driver (held in the left hand) in this hole and twisting the blade, the condenser may be moved away from the dial-condenser, thus tightening one belt. When the condenser is moved to the point giving the correct belt tension, keep the condenser in that position and then, with another screw driver in the right hand, tighten the three screws that hold the condenser to the chassis.

In Model 30 (early type) and 32, both of which have moulded end-plate variable condensers, holes for moving the condensers are not provided in the metal bracket on which the condensers are mounted. In these sets the condensers may be moved with the fingers when adjusting the belts.

In four-condenser sets where two or three belts are placed over each other, the tension of the **under** belt must be adjusted first and the upper belts must be slack. If the upper belt is adjusted first, it will not be possible to judge the tension of the lower belt.

(c) The screws must be tightened carefully so the condenser will not move and change the belt tension. If the condenser does move, causing the belt tension to change, loosen the three screws, readjust the tension, and again tighten the screws. Repeat, if necessary, until when the screws are tight, the tension is correct. Make the screws very tight.

INSTALLING NO. 14902 CONDENSER

(No. 14902 Supersedes Nos. 7893, 8685, 8690 and 9575)

MODEL OF SET	MOUNTING	REMARKS
Board Type Sets	Chisel out space under board, solder leads to condenser terminals, and tack condenser to board with terminals inside.	Connect leads to points indicated in diagram of set. (See center view, Fig. 168.)
20—4640 24—4920	Mount in same position as old condenser and connect as shown in left-hand view, Fig. 168.	File holes in base of condenser toward condenser.
20—7570 19—4880	Mount in same position as old condenser and connect as shown in left-hand view, Fig. 168.	File holes in base of condenser away from condenser.
20—7960	Mount in same position as old condenser and connect as shown in left-hand view, Fig. 168.	
Early-Type 30	Mount in same position as old condenser and connect as shown in left-hand view, Fig. 168.	Be careful that terminals do not touch against variable condenser.*
35, 48 and Later-Type 30	Drill two holes in chassis frame, as shown in Fig. 168-A, and mount condenser on frame, behind No. 2 A. F. T.	Connect as shown in left-hand view, Fig. 168, running lead to +B, R. F. line through hole in bottom of chassis.
32, 33 and 49	Mount in same position as old condenser and connect as shown in left-hand view, Fig. 168.	
50	R. F. by-pass in same position. "A" and "B" by-pass, same position, but terminals at top.	Connect as indicated in diagram of set.
36, 37, 40, 42, 52, 56 and 57	Use same mounting holes, but place condenser on **inside** of chassis frame, behind No. 2 A. F. T., with condenser terminals at top.	Twist wires together and run them over top edge of chassis frame, down front, and under bottom, connecting as shown in right-hand view, Fig. 168.
38, 44 and 45	Mount on bottom of chassis in same position.	Connect as shown in right-hand view, Fig. 168.

* In early-type 30, the No. 14902 condenser may be installed without removing the sub-panel assembly, by sliding the condenser in under the tuning condensers from left-hand end of the chassis.

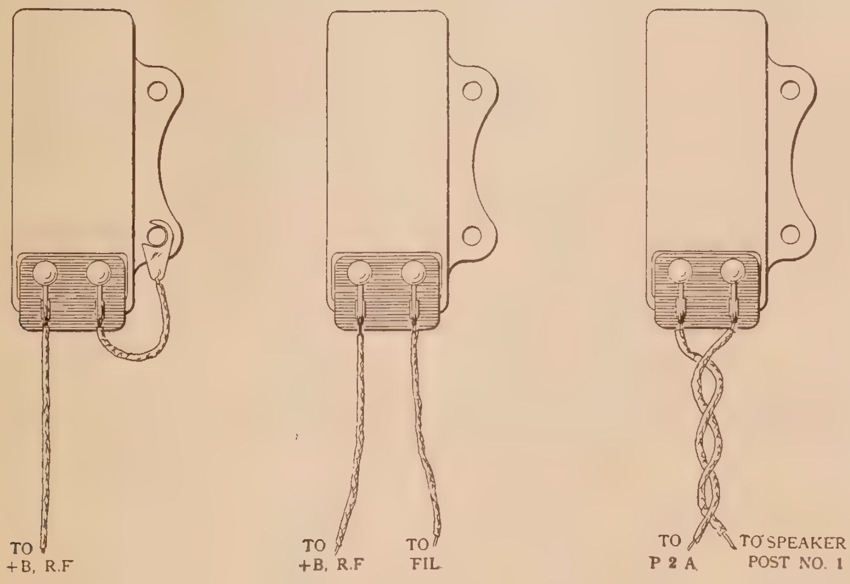


FIG. 168. SHOWING HOW NO. 14902 CONDENSER IS TO BE CONNECTED.

At Left, Connections as a Single By-pass in Cabinet-Type Battery Sets.

Center, Connections as a Single By-pass in Board-type Battery Sets.

Right, Connections as a Speaker-filter Condenser in A. C. Sets.

Neither side of the condenser is connected internally to the metal container.

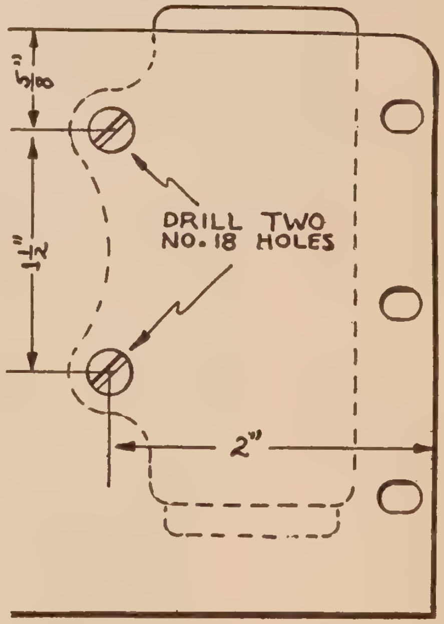


FIG. 168-A. SKETCH OF RIGHT-HAND END OF CHASSIS IN MODEL 35, 48 AND LATER-TYPE 30, SHOWING LOCATION OF TWO HOLES WHICH MUST BE DRILLED TO MOUNT NO. 14902 CONDENSER IN THESE SETS.

REPLACING 1st-A. F. CONDENSER IN POWER UNITS

No. 16318, 1st-A. F. filter condenser is to be used for replacement of **grounded** 1st-A. F. filter condensers in Model 40, 40-F, 42, 42-F, 43, 44, 44-F, 45, 46, 47, 52, 53, 56 and 57.

If continuity tests show that the 1st-A. F. filter condenser is grounded (as indicated by a "full" reading on the continuity meter when testing from either lead to the metal container of the power unit, when the two leads are unsoldered from the panel assembly), proceed as follows:

1. Cut off the two leads to the defective condenser close to the sealing compound.
2. Solder two 12″ leads of No. 20 wire with durable insulation, to the contacts on a No. 16318 1st-A. F. condenser.
3. Mount this condenser at the left-hand side of the panel assembly, **with contact at bottom,** as indicated in the diagram. The condenser may be installed by placing the rear edge in the recessed part of the inside-back of the container and pressing down on the front edge, thus forcing the condenser into position.
4. Connect one lead to +B, 1st-A. F. terminal and connect the other lead to the terminal which is connected to the center tap of the R. F. — 1st-A. F. filament shunt resistor.

No. 16318 condenser cannot be used in No. 13315 condenser and choke assembly in view of the fact that this assembly contains an entirely different condenser with which the No. 16318 condenser will not function.

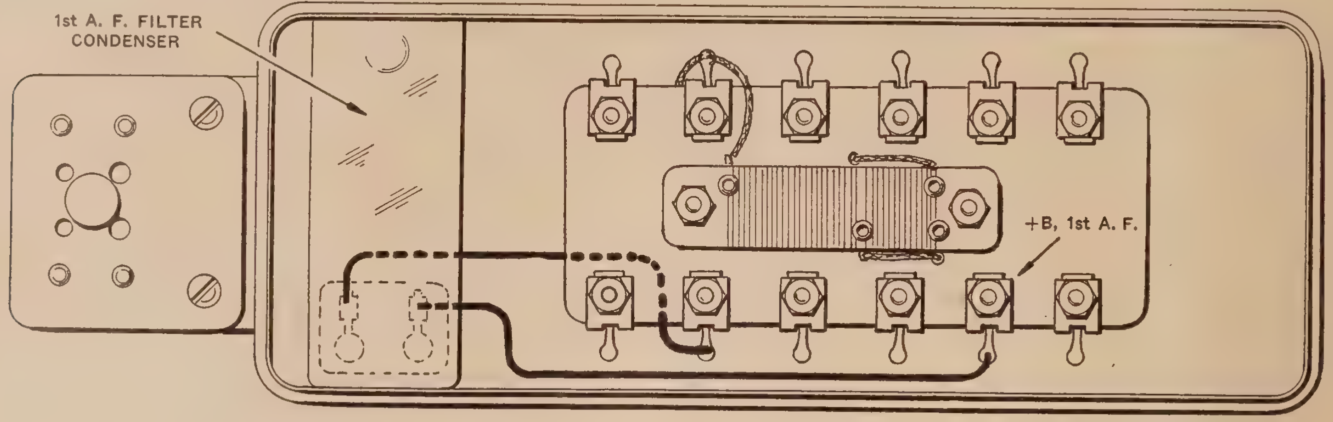


Fig. 168-B. How No. 16318 Condenser is Mounted and Connected.

In 25-cycle power units, and in Model 46, 47 and 53, the power unit is wider than shown above and the replacement No. 16318 condenser should be held in place with sealing wax.

The leads to the original 1st-A. F. filter condenser in Model 40, 42, 44, 45, 56 and 57 were black-with-red-tracer, and blue (or red). In Model 43, 46, 47 and 53 both leads were black-with-red-tracer. If the original 1st-A. F. filter condenser is found to be grounded, the two leads to it should be cut off close to the sealing compound, and the replacement No. 16318 should be mounted and connected as shown above.

CHANGE IN 2nd-A. F. BIAS RESISTORS IN MODEL 55, 55-C, 60 AND 60-C

When either the yellow (No. 15544) or the maroon (No. 15545) 2nd-A. F. bias resistor in Model 55, 55-C, 60 and 60-C, requires replacing, **DO NOT** use a new yellow or maroon resistor for replacement, but proceed as follows:

1. Remove both the yellow and the maroon resistors.
2. Return BOTH the yellow and the maroon resistors to your distributor and ask him to replace them with one white (No. 16724) and one black (No. 15592) resistor. These units will be replaced no charge only when the set is within the regular ninety-day warranty period.
3. Install a white (No. 16724) resistor in place of the yellow.
4. Install a black (No. 15592) resistor in place of the maroon.

The change applies only to the 2nd-A. F. bias resistor in Model 55, 55-C, 60 and 60-C, and does not apply to any other model.

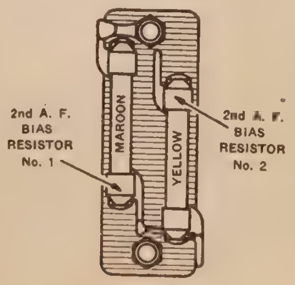


Fig. 168-C. Remove the Yellow and the Maroon Resistors.

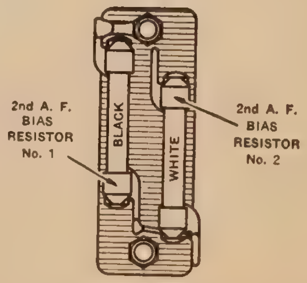


Fig. 168-D. Install a Black Resistor and a White Resistor as Shown Above.

MAGNETIC SPEAKERS (Horn Type)

A. Testing.

Test the coil and cord for continuity and then carefully inspect the other parts, looking for the following.

B. Possible Troubles.

1—Iron or other foreign particles on pole pieces. (Sometimes these particles are so small as to be hardly visible).
Remedy:—Pick off with a small sharp knife, working outward and upward from between the pole pieces.

2—Diaphragm bent, buckled or up-side down.
Remedy:—Replace diaphragm or assemble correctly.

3—Weak spring. Spring may give insufficient pressure against diaphragm, causing rattling on very loud signals.
Remedy:—Replace spring or bend so as to increase height of all four of the bends, making them all exactly the same height.

4—Rubber gaskets. If these show signs of deterioration they should be replaced. If new gaskets are used in reassembling the unit, each should be stretched to fit tightly in the housing. This may be done by holding the gasket by both forefingers and expanding it for a moment to a length of about eighteen inches, repeating this three or four times.

5—Weak magnet. Test with weight-scale in the following manner:

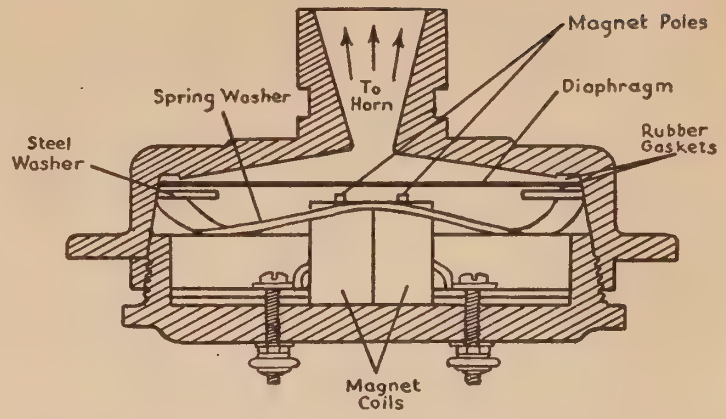


Fig. 169. Cross Section View of Sound Unit (Horn Type).

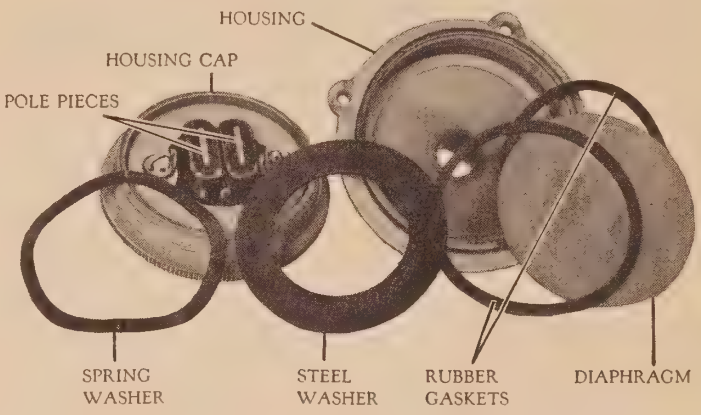


Fig. 170. Horn Type Unit, Disassembled.

C.—Testing Magnets in Horn Type Units.

Equipment for testing the strength of the sound unit magnet is very simple and inexpensive, consisting of a small spring-type weight scale, about 0-10 pounds,—(which may also be used in testing the cone type sound unit magnets) and a circular flat disc, ground absolutely flat, of soft iron (Swedish or "Armco" iron) about 1 inch in diameter and 1/16 inch thick. This disc should have a small central stud, carrying a hole, attached to the center of one of its sides. A loop of strong flexible string, about an inch or two in length, should be attached to the hole in the stud.

To test the strength of the magnet in a horn type sound unit, place the flat side of the disc centrally on the pole pieces, loop the string over the weight-scale hook and carefully exert a steady pull exactly along the axis of the unit until the magnet lets go. The position of the speaker unit and scale is shown clearly in the accompanying illustration, Fig. 171.

When pulling on the horn type sound unit, the disc "armature" should not be released until the scale registers a pull of about 4 pounds or more. Assuming that the weight-scale has been checked for accuracy, if the reading is appreciably less than 4 pounds, and if the speaker is noticeably weak in actual reception, the sound unit should be replaced.

After the unit has been carefully examined and tested, and any defective parts repaired or replaced, it may then be reassembled.

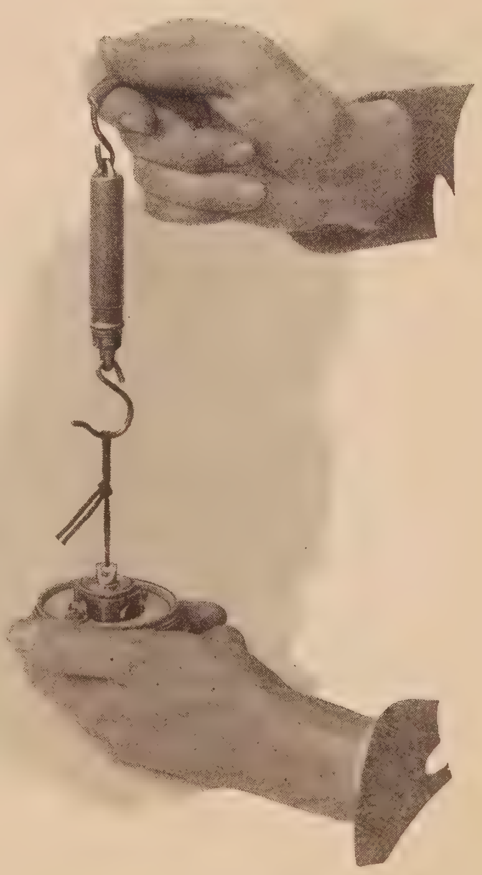


Fig. 171. Testing Magnet Strength, Horn Type Unit.

Magnetic Speakers (Continued)

D. Assembling Horn Type Unit.

(1) RUBBER GASKET—place in its groove in housing and use the steel washer to press the gasket into place. The gasket should not fall out when the housing is inverted and shaken. The steel washer should, of course, be removed.

(2) DIAPHRAGM—center on the rubber gasket with the concaved side toward the horn. It is very important that the diaphragm should be placed with the concaved or hollow side facing the horn opening. Instructions to this effect are rubber-stamped on the concaved side of each diaphragm. Also it is extremely important that the diaphragm should be centered perfectly on the rubber gasket and that it does not touch the metal housing at any point, otherwise the diaphragm will rattle.

(3) RUBBER GASKET—place over the diaphragm and press into position with the steel washer, taking care not to disturb the diaphragm setting.

(4) STEEL WASHER—place over the rubber gasket with the concaved or hollow side facing the diaphragm. The concaved side of the steel washer may be found by laying a straight edge across the face of the washer and holding both up to the light.

(5) BRONZE SPRING WASHER—place in housing over the steel washer.

(6) HOUSING CAP—screw clockwise on housing.

E. Adjusting the Horn Speaker.

The speaker should be adjusted during reception of a strong and clear broadcast station. Screw up the knurled housing cap clockwise until the diaphragm snaps against the pole pieces, causing reception to become weak and rattling. It should then be unscrewed until a click occurs and reception comes out clear and normal, the best adjustment being as close (turned clockwise) as possible without rattling on a strong signal.

It is necessary to have the horn type speaker leads connected to the receiving set in the proper manner, which is clearly specified on the Atwater Kent horn type sound units and also on the Atwater Kent battery-type radio receivers.

MAGNETIC SPEAKERS (Cone Type)

Free-Edge Cone Type (Model E and E-2)

The Atwater Kent Model E and Model E-2 Speakers are of the free-edge cone type. Their construction is much more rugged than that of the average cone, so that repairs are seldom required. All steel parts are thoroughly rust-proofed, and both the coil windings and the cone itself are impregnated with moisture-proofing compound.

The sound unit used in these speakers is enclosed in a dust-proof rubberized bag which protects the unit from iron particles and dust.

In order to examine and test the parts, it is necessary to disassemble the speaker. Instructions for doing this and instructions for testing, repairing and assembling this type of speaker are given below.

A. Disassembling the "Type E" Speaker.

(1) Removing Grill.

Remove the four screws around the outer housing of speaker, then remove the front (grill) in this way:

Stand the speaker on a firm table, place a double fold of heavy cloth over the top of the grill of the housing, hook the thumb of the left hand under the top edge of the grill, with the other fingers of the left hand pressing down on the top of the housing, and then, through the cloth, hit the top of the edge of the grill several sharp blows with a hammer, at the same time pulling forward with the thumb. The vibrational effect of the hammer blows tends to loosen the grill from the housing, while the steady pull with the thumb tends to move the grill forward and off the housing. The cloth is used to protect the finish of the grill, which would otherwise be marred by the hammer blows. In removing the grill, be careful not to let it hit against the cone.

(2) Removing Cone.

The cone is attached to the flat reed spring by a small bolt and nut. Two special wrenches (Part No. 9255) should be used in removing this bolt, the illustration, Fig. 174, showing how this should be done. Hold the cone by the small metal bracket at its apex and pull straight off from the reed spring.

(3) Removing Sound Unit.

The sound unit is removed by unscrewing the two acorn nuts at the rear of the housing. Note how the cord is brought over the top and in back of the sound unit down to the small hole at the rear of the housing. When assembling the speaker, the cord should be arranged in the same way. In handling the sound unit be very careful not to strain the flat reed spring.

B. Possible Troubles.

1. OPEN COIL OR CORD—test with voltmeter and battery for continuity. Replace if found defective.

2. DAMAGED CONE—examine carefully for cracks and bends, especially around the apex. If no defect is found, hold the cone horizontally with hollow side up about 3 or 4 inches above a firm wood-topped table and then drop so that the apex will hit the table. If the cone is in satisfactory condition it will strike with a clear resonant "knock" rather than a dull, lifeless thump or thud. Replace cone if it seems to be defective.

3. METAL CHIPS ON POLE PIECES—carefully remove the dust-proof bag from the sound unit and examine the air-spaces between the reed and pole pieces to determine whether iron or other particles (caught up by the attraction of the magnets) are clogging up the air-spaces between reed and pole pieces and consequently interfering with free motion of the reed. If such a condition is found, it is sometimes possible to remove the particles, although usually it is advisable to replace the unit.

Magnetic Speakers (Continued)

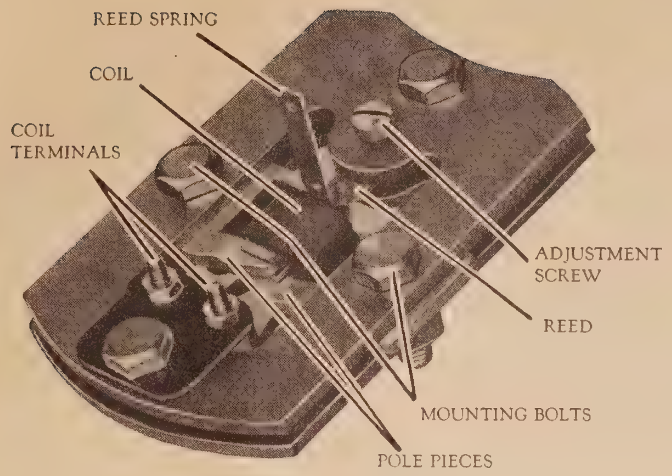


Fig. 172. Cone Type Unit.

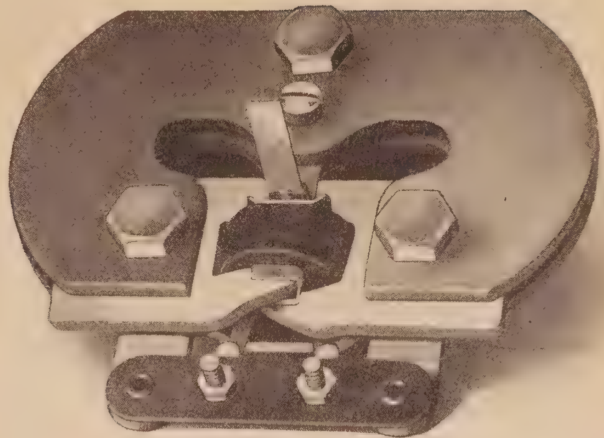


Fig. 173. New Style Unit Used in Atwater Kent Cone Type Speakers.

4. IMPERFECTLY ADJUSTED SOUND UNIT—examine the sound unit to see if the reed is adjusted centrally between the pole pieces so that the air-spaces at each side are equal. If the reed is not centered correctly, the unit should be replaced, although in exceptional cases a qualified service man may adjust the reed.

Adjustment of the reed is made through the two screws which pass through the magnet and bear on the reed. By loosening one screw and tightening the other, the reed may be moved to either side. When the reed has been adjusted exactly to the center the two screws should be tightened alternately little by little, until both are tight.

The adjustment may be tested by clasping the reed spring, near the reed, between the thumb and forefinger and pushing and pulling so as to cause reed to snap against either pole piece. The same force should be required to move the reed in each direction. If the unit is properly adjusted see that the air-spaces are free from chips and then carefully replace the dust-proof bag.

5. LOOSE NAME PLATE OR SERIAL PLATE—Suspend the grill by one hand and with the wood handle of a screw driver sharply tap the grill near the name plate. Listen carefully and if a "tinny" noise is heard, the name plate is not fastened securely and should be tightened by hammering down the holding tabs. Do the same with the serial plate on the back of the housing.

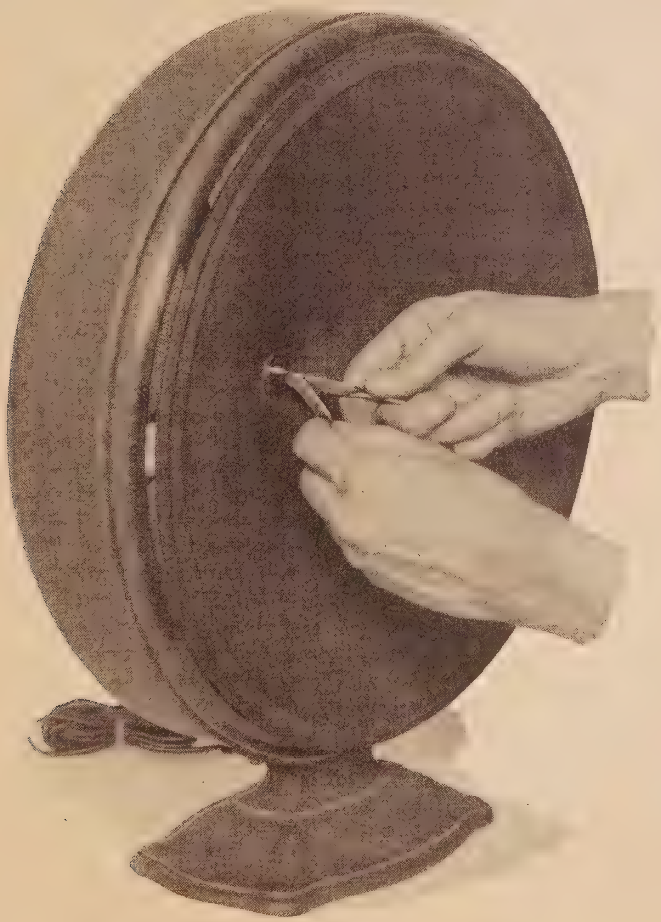


Fig. 174. Removing Cone, Model E and E-2.

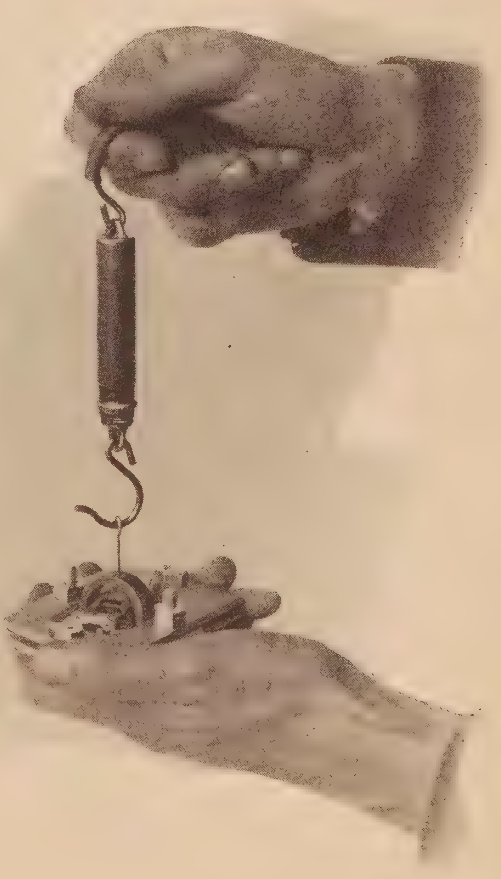


Fig. 175. Testing Magnet Strength, Cone Type Unit.

Magnetic Speakers (Continued)

6. WEAK MAGNET—The testing outfit for determining the magnet strength is identical with that used for the horn speaker, except that instead of the flat disk a U-shaped bar is used. This bar must be accurately made so that when suspended, inverted, from the scale, its inside circumference clears the coil winding and the ends of the "U" rest flatly one on each magnet pole, lying clearly within the permanent magnet by about 1/64" on each side. It will be found more convenient to use the front or cone side of the unit for this test.

The dimensions of the bar are—width 3/8", thickness 3/32", diameter (over all) 1-3/16". If a straight pull of less than about 7 pounds will separate armature from magnet, a weak magnet is indicated and the unit should then be replaced. Fig. 175 illustrates the correct method of testing the magnet.

C. Assembling Cone Type Speaker.

1. ATTACHING SOUND UNIT—place the sound unit in the housing so that the mounting bolts pass through the holes in the back of the speaker, and screw on the acorn nuts. The unit should be enclosed in its dust-proof bag and the cord leads should be firmly attached to the coil terminals. The cord should be carried over the top of the unit, around the right-hand side and down to the outlet hole in the rear of the housing.

2. RUBBER DAMPER—push the small piece of rubber tubing on the flat reed spring, bringing it close to, but not touching, the unit.

3. MOUNTING CONE—push the metal bracket at the apex of the cone on to the flat reed spring and push the small screw through holes. Screw on the nut but do not make it very tight.

With the two special wrenches (part No. 9255) on this small nut and bolt, tip the cone up or down so that its top and bottom edges are equally spaced from the housing, then carefully tighten the bolt. If the cone moves out of position, the bolt must be loosened and the cone again adjusted until the top and bottom edges are equally spaced from the housing when the bolt is fastened tightly.

Then examine the right- and left-hand edges of the cone to see if they are equally spaced from the housing. If they are not, use a pair of pliers to bend the reed spring very carefully and easily toward the side of the cone that is too close to the housing. When the spring is released it will be found that the edge of the cone is now spaced farther from the housing. Repeat this process until the right- and left-hand edges of the cone are equally spaced from the housing. The spacing between the edge of the cone and the housing should then be even all the way around. (In bending the reed spring, hold the pliers horizontally and grip the end of the metal bracket which fits over the reed spring. The best tool for this purpose is a parallel-jaw pliers, ⅜ inch wide, with the ends slotted to fit over the bolt and nut. The slot should be about 7/32 inch wide and ¼ inch deep.)

4. REPLACING GRILL—Rest the speaker on its back and press the grill on to the housing, taking care to see that the screw holes coincide and that the grill is placed with the name plate right side up. It may be necessary to use a hammer in fitting the grill on the housing and, in this case, as before, a thick cloth should be used to protect the finish of the grill from the hammer blows. When the grill is in place, replace the four screws which hold it to frame.

Model E-3 Held-Edge Cone

The manner of disassembling, repairing and assembling the E-3 is exactly the same as for the E and E-2.

The cone of the Model E-3 speaker has a flexible rubberized fringe extending beyond the edge of the cone. Before the grill is placed on the housing, the cone and fringe are clear of the housing, with equal spacing all around between the rubber fringe and the housing. The grill has a strip of felt around its inside edge, and when the grill is pressed down on the housing, the outer edge of the rubber fringe is pressed tightly between the edge of the housing and the felt strip in the grill.

The small rubber damper is not used on the Model E-3 speaker.

SPEAKER IN MODEL 52, 56 AND 57

The speaker in Model 52 receiving set is of the "held-edge" type, somewhat like Model E-3. The flexible edge of the diaphragm is pressed all around between the housing flange and a large fibre ring.

The small rubber reed-spring damper is not used on this model.

In mounting the diaphragm, make certain that the edge of the cone (where it is joined to the flexible fringe) is level all around. If the diaphragm is not mounted properly on the reed spring, or if the spring is bent, the edge of the cone will extend up on one side and be depressed on the other. The remedy is the same as given above under the heading "Mounting Cone."

When replacing the speaker, put the fibre ring on top of the diaphragm, lining up the holes in the ring and those in the diaphragm and housing flange. Then place the wire grill on top of the fibre ring in such a way that, when mounted upright in normal position in cabinet, the unbent grill wires are horizontal. (Model 56 and 57 do not have the wire grill.)

ELECTRO-DYNAMIC SPEAKERS

The outstanding advantages of the electro-dynamic type of speaker are its ability to respond over the entire musical range with equal fidelity, and to handle large volume without distortion.

The first characteristic is due to the method of feeding the output of the receiver into the speaker, which is entirely different from that of previous speakers such as the horn or magnetic cone type. Instead of the output of the set being passed through the field coils of a permanent magnet, which have a high inductance value, it is passed through a small coil of slight resistance, but practically no inductance, located on the apex of the vibrating cone and immediately within the field of electro-magnet. Since resistance, unlike inductance, does not vary with frequency, the response to all frequencies, or "notes" of the musical scale is practically equal.

The ability to handle volume is largely due to the method of mounting the cone, which is so suspended that it has unlimited freedom of movement horizontally, as far as any requirements of reception are involved.

The powerful magnetic field created by the electro-magnet (energized by D. C. taken from the power unit of the set) helps to give the Atwater Kent electro-dynamic speaker maximum sensitivity and power.

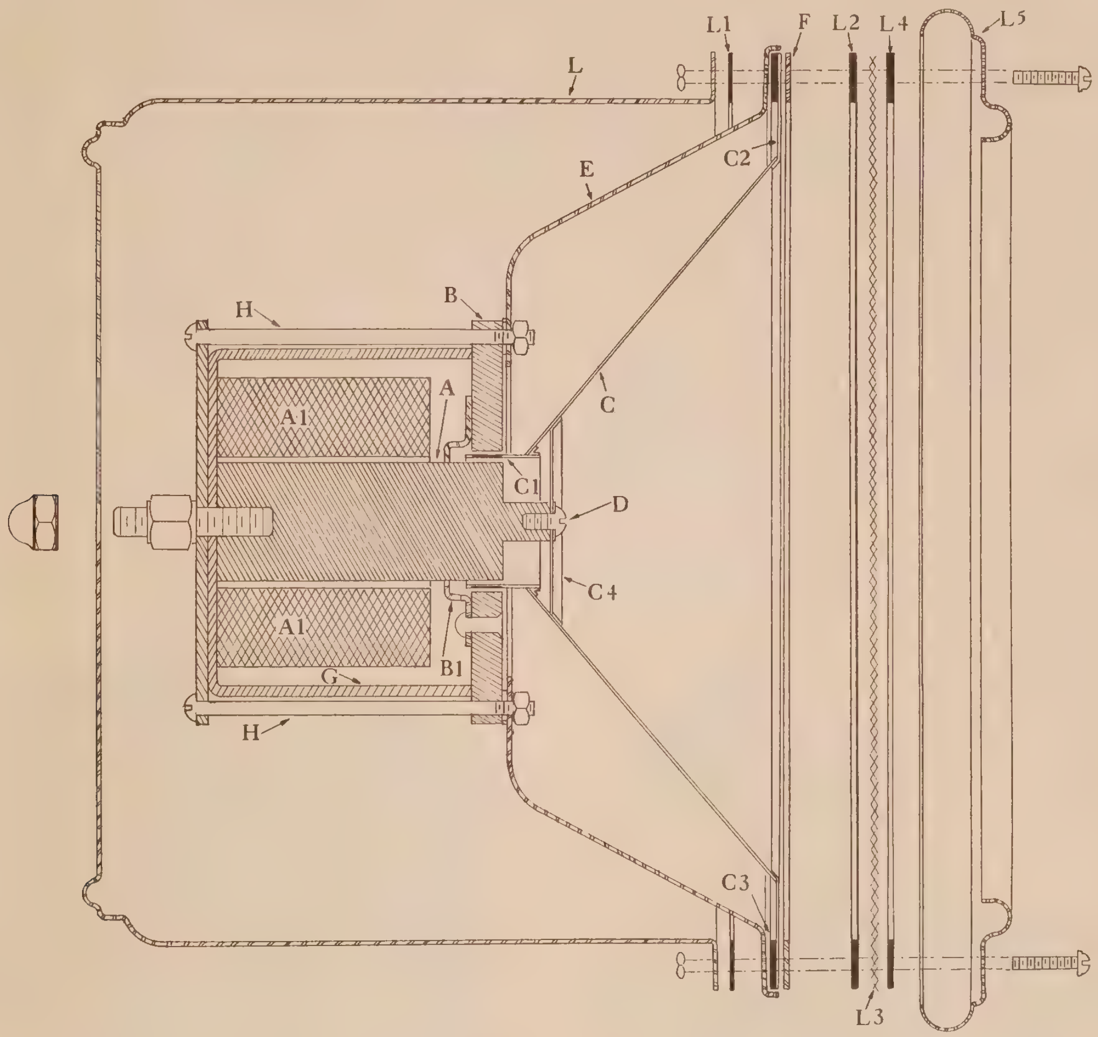


Fig. 176. Cross Section Drawing of Type F, F-2, F-4, F-6 and F-7 Speaker.

A=Round soft-iron rod, forming core of magnet coil and serving as one pole-piece of the magnet.
A1=Field coil. This energizes the magnet.
B=Round steel top plate with 1½″ hole at center. This forms the other pole-piece of magnet.
C=Diaphragm or cone assembly, consisting of the following parts:
C1=Diaphragm coil or "Voice" coil, attached to cone. This coil fits into the air-gap between pole-pieces "A" and "B." The top of the winding should be approximately level with the top of the air-gap.
C2=Flexible seal or baffle, portion of diaphragm. This serves to prevent undesired neutralization of air pressure at front and rear of cone.
C3=Fibre ring (about 11″ in diameter) permanently attached to the edge of the flexible seal.
C4=Flexible spider.
D=Round-head screw which clamps the spider to the pole-piece "A."
E=Cone-supporting or diaphragm-supporting frame.
F=Steel ring (about 11″ diameter) with 12 holes, 6 countersunk. The edge of the flexible seal "C2" and the fibre ring "C3," are clamped between "E" and "F" by 6 flat-head machine screws.
G=Magnet-coil case which completes the metal part of the magnet by linking pole-pieces "A" and "B."
H=Bolts which clamp together the cone-supporting frame, the circular pole-piece "B" and the magnet coil case "G."
L=Speaker housing.
L1=Thin fibre ring.
L2=Cloth screen with attached fibre ring.
L3=Wire grill, arranged with unbent wires horizontal when speaker is standing in normal position.
L4=Fibre ring (about 11″ diameter).
L5=Grill-front.

Service Data—Electro-Dynamic Speakers

A. Centering Top Pole Piece.

In later-type electro-dynamic speakers, the top pole piece does not have a centering disc. For this reason it is necessary to center the top pole piece whenever this part is replaced or adjusted. This centering requires three gauges. Each gauge may be a three-inch length of No. 54 drill-rod, or if desired the shanks of three No. 54 drills may be used for the same purpose.

Procedure: (1) Loosen the nuts that clamp the top pole piece, the cone housing, and the field-coil case.

(2) Insert the three gauges in the magnet gap, as illustrated in Fig. 177. Tighten the bolts very securely and then remove the gauges.

B. Imperfectly Centered Diaphragm Coil.

The diaphragm coil fits into the circular air-gap and should be centered perfectly without touching the pole-pieces at any point. If the coil does touch, as indicated by a faint scraping sound as the diaphragm is moved straight in and out (see Fig. 180), readjustment is necessary. Instructions for centering the diaphragm coil are given in the following paragraphs:

C. Centering Diaphragm Coil.

Loosen the six flat-headed screws around the cone-supporting frame. (These screws need not be loosened if the diaphragm has not been changed in any way from the factory adjustment.) Loosen the round-headed screw which passes through the spider near the inside apex of the cone.

Put three shims (see Fig. 178) in place between the inside of the diaphragm coil form and the center pole-piece. The shims should be equally spaced (120° apart) by placing them at the three points where the outermost and next inner circles of the spider are linked together.

With the shims in place, the diaphragm coil will be thus properly centered, and the round-head screw may be tightened, clamping the spider in the correct position. Note that a metal washer is used between the head of the screw and the fibre washer. If the six flat-head screws in the cone-supporting frame are loose, they should be tightened. When the screws are tight, remove the three shims.

The next step is to determine if the diaphragm coil is properly centered. Move the diaphragm coil straight up and down with the thumbs, as shown in Fig. 180. By listening carefully, and by the "feel" of the thumbs, it will be possible to determine if the diaphragm coil is scraping against the pole-pieces. If the diaphragm coil does scrape, loosen the round-head screw, put the three shims in place and tighten the screw. Remove the shims and again test for scraping. If the diaphragm coil continues to scrape, the trouble may be caused by a warped diaphragm-coil form or a badly warped spider. In either case it is advisable to substitute a new diaphragm assembly (consisting of the cone with attached flexible seal, spider and the diaphragm coil.)

Inspect the diaphragm coil to see if the top of this **winding** is approximately level with the top of the air-gap. Any condition other than this indicates either that the spider is warped or that the metal washers between the cone-supporting frame and the circular pole-piece are not of the correct thickness. First examine the spider to determine if it is warped; normally it should be flat. If it is warped, replace the diaphragm assembly.

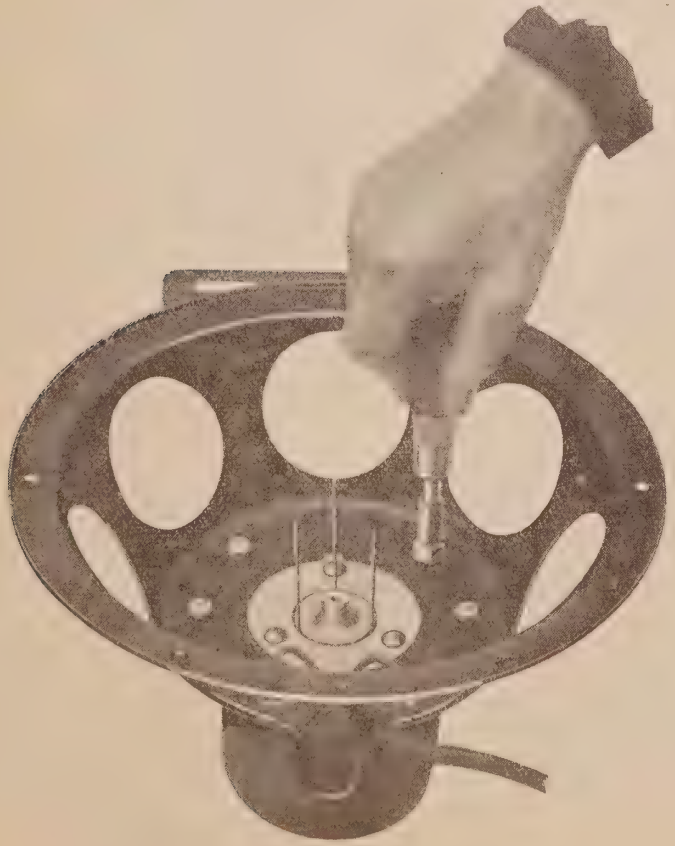


Fig. 177. Centering Top Pole Piece.

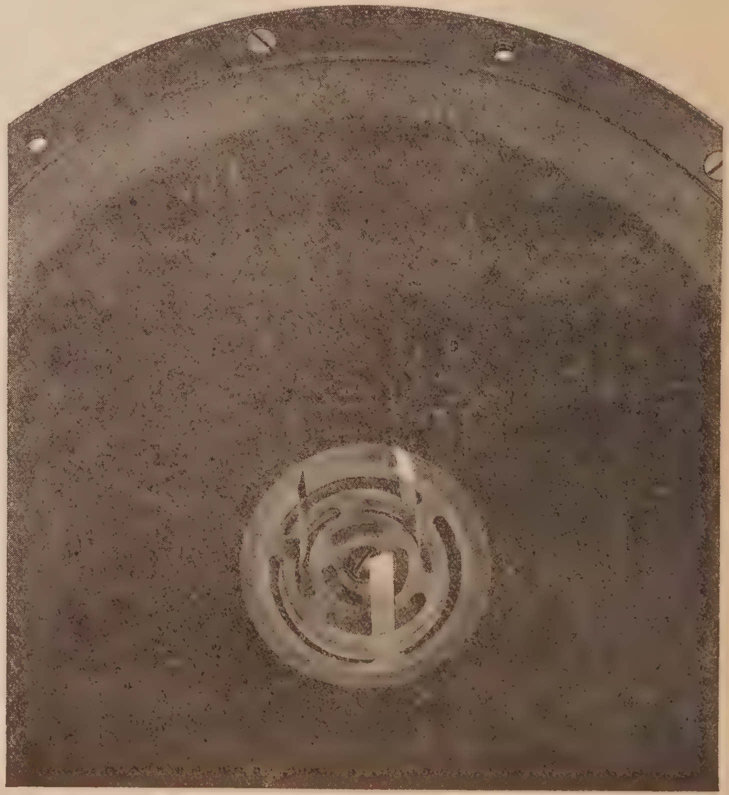


Fig. 178. Correct Position of Shims Used in Centering Diaphragm Coil.
The shims or "diaphragm coil centering-gauges" are Part No. 20171

Causes and Remedies for Rattling in Electro-Dynamic Speakers

Possible Cause	Remedy
Defective diaphragm (cracked, torn or badly warped). Diaphragm coil not rigidly attached to diaphragm. Spider not securely cemented to diaphragm all around.	Replace diaphragm assembly. (Consists of diaphragm, with attached coil, spider and flexible seal.)
One or more of bolts that clamp the magnet-coil case, top pole-piece and cone-supporting frame not screwed tight.	Make bolts very tight.
Ends of grill wires touching grill-front (except in chassis-type speakers).	Cut off ends of grill wires and center grill correctly.
Fibre ring or rings not inserted between metal parts of grill assembly (except in chassis-type speakers).	Put fibre rings at places shown in cross-section view Fig. 176.
Diaphragm coil scraping against pole-pieces, caused either by incorrectly centered coil, or by warped coil-form or warped spider.	Center diaphragm coil correctly according to instructions given in text, or replace diaphragm assembly if coil-form or spider is warped.
Diaphragm coil flexible leads touching or close to edges of cone-supporting frame, or lying against cone.	Form leads into a loop which is entirely free and clear from cone and frame.
Loose terminal screws on cone-supporting frame. Loose base screws. Loose flat-head screws in cone-supporting frame. Loose screws in grill assembly. Loose hexagon nut at rear of housing. Loose screws in rear metal supporting strip (console type speaker).	Tighten screws.

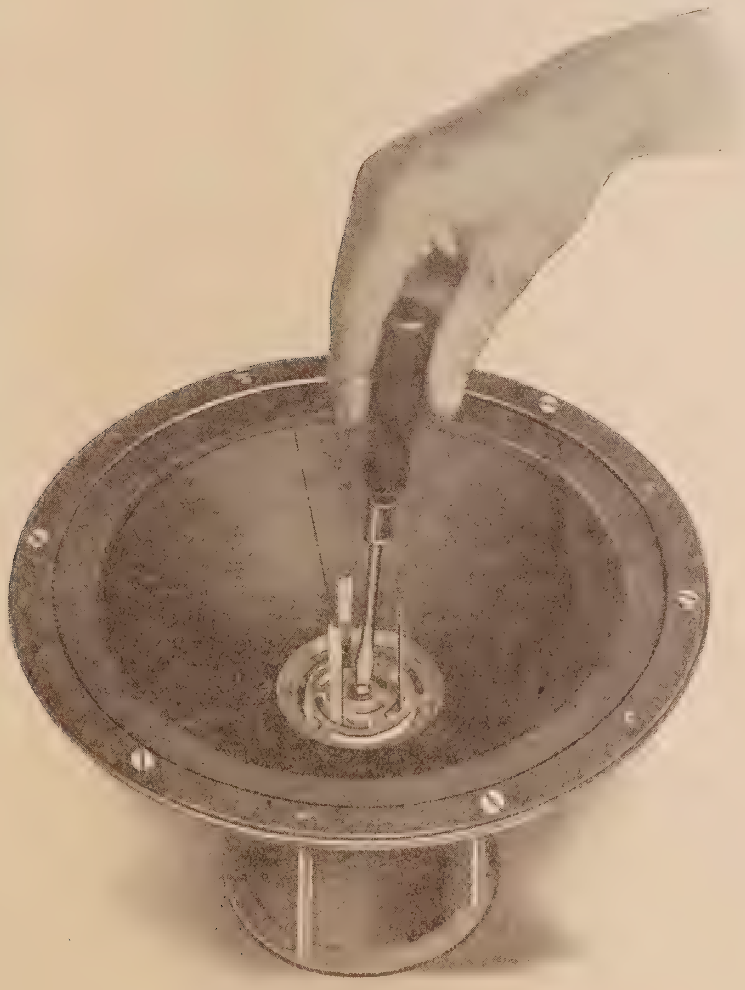


Fig. 179. Tightening Round-Head Diaphragm Screw, After Diaphragm Coil Has Been Properly Centered.

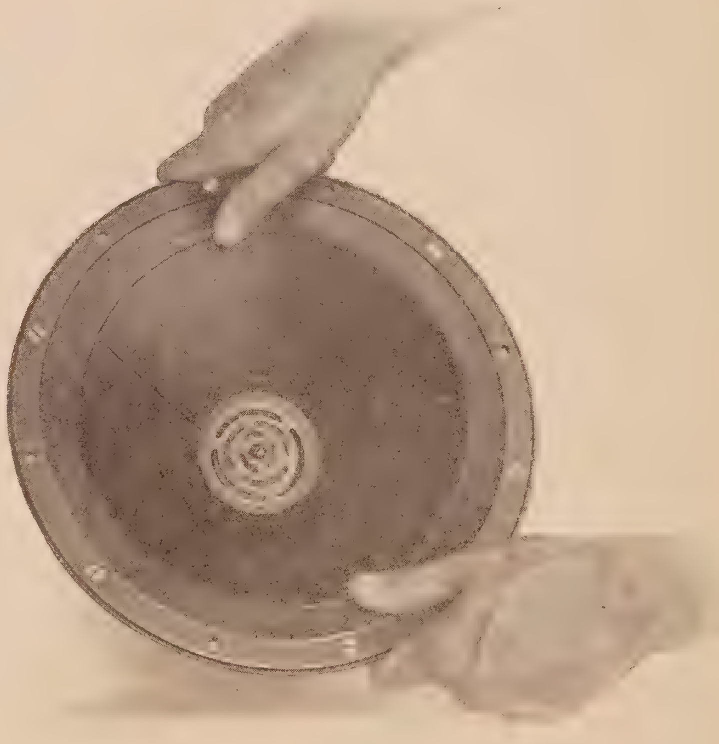


Fig. 180. Testing to Determine if Diaphragm Coil Scrapes on Pole-Pieces.

THE SERVICE MANUAL IS CONTINUED ON PAGE 201. THERE WILL BE NO SERVICE MANUAL PAGES BETWEEN PAGES 120 AND 201

ATWATER KENT

RADIO

PARTS LIST

IMPORTANT NOTICE

Owing to revisions that are now being made, this Service Manual is NOT complete, but contains only such information as is needed for servicing Atwater Kent screen-grid receivers only.

The present Manual contains the following pages only:

Pages 115 to 146.
Pages 201 to 216.
Pages 51 to 64 (Parts List).

Please note that the Price List is omitted, and that there is no service information prior to the screen-grid models. These sections are exhausted and cannot be furnished for some time.

The completely revised Manual, Parts List, Price List, and additional supplements will be mailed to all regular Atwater Kent Radio Dealers as soon as possible.

OCTOBER, 1930

ATWATER KENT MANUFACTURING COMPANY
4700 WISSAHICKON AVENUE, PHILADELPHIA, PA.

Printed in U. S. A. Copyright Aug. 1928, by Atwater Kent Mfg. Co.

ATWATER KENT WARRANTY
FOR 1930-1931

We warrant each new Atwater Kent Radio Receiver and Radio Speaker to be free from defect in material and workmanship.

Our obligations under this warranty are limited to the following: In the event that any part of this equipment proves defective and is returned, transportation charges prepaid, to the Atwater Kent Radio Distributor within ninety (90) days from the date of the sale by the dealer to his customer, the defective part will be replaced and any necessary labor supplied without cost to the customer.

This warranty does not apply to any receiver or speaker which has been subject to misuse, neglect or accident, nor to any receiver or speaker which has not been connected in accordance with the instructions enclosed in the original container. Neither does it apply to any receiver or speaker, the serial number of which has been altered or removed. We do not assume any responsibility for tubes or other accessories not manufactured by us.

This warranty is in lieu of all other warranties expressed or implied; and we do not authorize any person or representative to assume for us any other liability in connection with our equipment.

Warranty material is repaired or replaced. Credit is not issued.

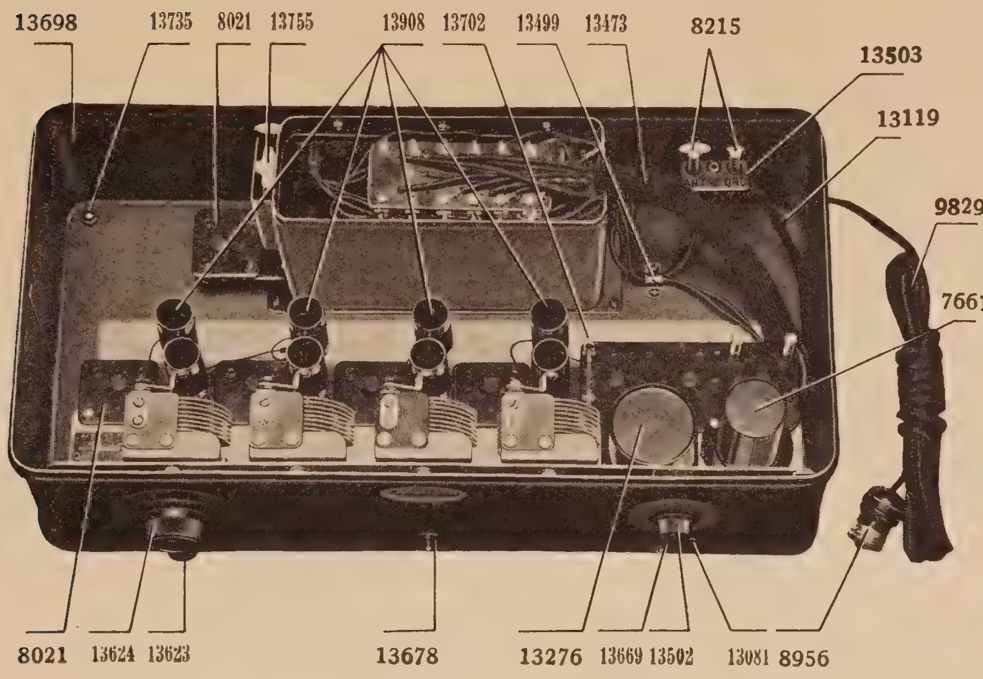
The parts listed herewith are sold to Atwater Kent Radio Distributors for service purposes only. Parts not listed by number and name are not sold singly and come only as part of an assembly.

When ordering, be sure to give both the number and name of the part desired.

IMPORTANT

For additional information about parts used in the screen-grid models, see Pages 132, 133 and 146 of the Service Manual.

MODEL 44, No. 9900 SET



13410 CABINET COMPLETE

Part No.	
13516	Dial Indicator
13698	Cabinet Body
13628	Vernier Knob Screw
1547	Vernier Stud Screw
4822	Vernier Stud Lockwasher
13631	Ball Feet
13632	Ball Feet Retaining Screw
13735	Round Head Base Nut
9366	Hex. Base Nut
13701	Cabinet Lid
13634	Lid Name-plate
8272	Lid Name-plate Rivet
13702	Tube Chart

13363 DETECTOR AND 2-STAGE AMPLIFIER

Note:—See Model 37—No. 9500 list for parts.

13743 POWER SUPPLY CABLE AND PANEL

13742	Cable Sleeve
13506	Connection Panel

13390 VOLUME CONTROL UNIT

13501	Housing
13502	Knob
9785	Contact Arm
13112	Contact Arm Set Screw
13247	Knob Holding Spring
13604	Resistance Unit
13691	Lead (red)
13692	Lead (green)
13693	Lead (yellow)
13503	Antenna and Ground Base
13569	Antenna and Ground Post Screw
13123	Brown Insulation Sleeving
13504	Ant. and Grd. Cable and Base Assembly

SET PARTS

Part No.	
13908	R. F. Coil Group
13200	Variable Condenser Group
8021	Tube Socket
13383	R. F. Plate Resistance
13668	Antenna Cplg. Transformer
9575	Single Bypass Condenser
13105	Double Bypass Condenser
8439	No. 1 and No. 3 Grid Resistance
8225	No. 2 Grid Resistance
13675	Short Belt
13676	Long Belt
13677	Extra Long Belt
13688	Wiring Assembly
13678	3 Pole Toggle Switch
13499	Cable Bracket
13811	Cable Bracket Screw
13624	Dial
13623	Vernier Knob-less Screw
13609	Shipping Container
13492	Literature Assembly

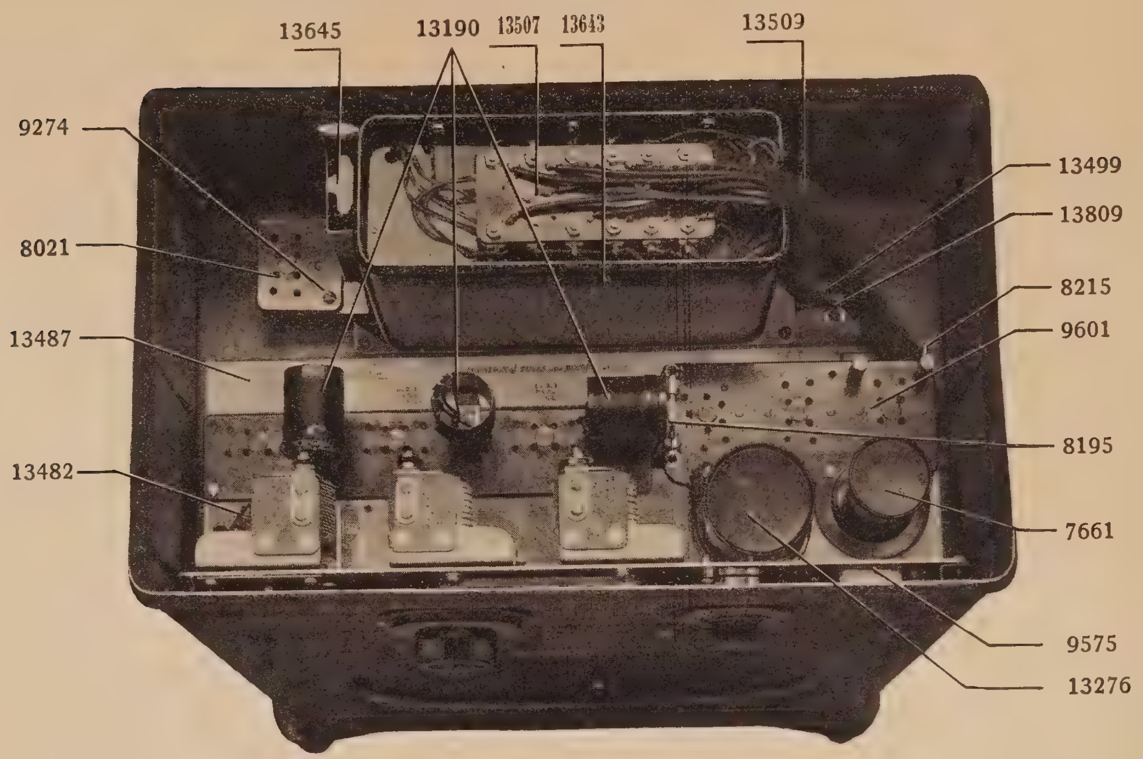
POWER SUPPLY PARTS

13754	Transf. Cond and Choke Assembly
13755	Automatic Voltage Control
13758	Panel Assembly
13534	Panel and Resis. Holders
13756	Bias Resistance
13664	Toggle Switch
13556	Cover

Note:—Many parts for Model No. 44—No. 9900 Set are the same as those used on Model No. 38—No. 9400 Set. Therefore, only parts which differ are given under Model No. 44 and all others should be selected from previous lists.

Refer to numerical list for prices.

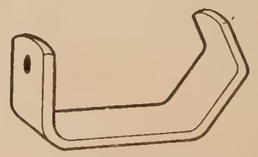
MODEL 52, No. 9930 SET

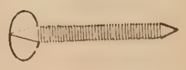


SET PARTS

Part No.	
13499	Cable Bracket
7689	Cable Bracket Strap
13487	Tube Chart
13882	Antenna Name Plate
13989	Ground Clamp Assembly
13899	Ground Clamp only
13897	Ground Clamp Screw
13928	Washer
13926	Literature Assembly
13898	Shipping Container

NOTE:—Parts Not listed above are the same as those used on Model 42, No. 9850 Set, and should be selected from Previous Parts Lists


13899 GROUND CLAMP


13897 GROUND CLAMP SCREW

13530 VOLUME CONTROL UNIT

Part No.	
9798	Lead (red)
8499	Lead (green)
13607	Lead (yellow)
13943	Antenna Cable
13944	Ground Cable
13946	Terminal
13937	Wire Clamp

NOTE:—All other parts of 13530 Volume Control unit are the same as those used on No. 13320 Volume control unit for Models 40 and 42, and should be selected from previous lists.

13363 DETECTOR AND TWO-STAGE AMPLIFIER

13190 R. F. AMPLIFIER ASSEMBLY

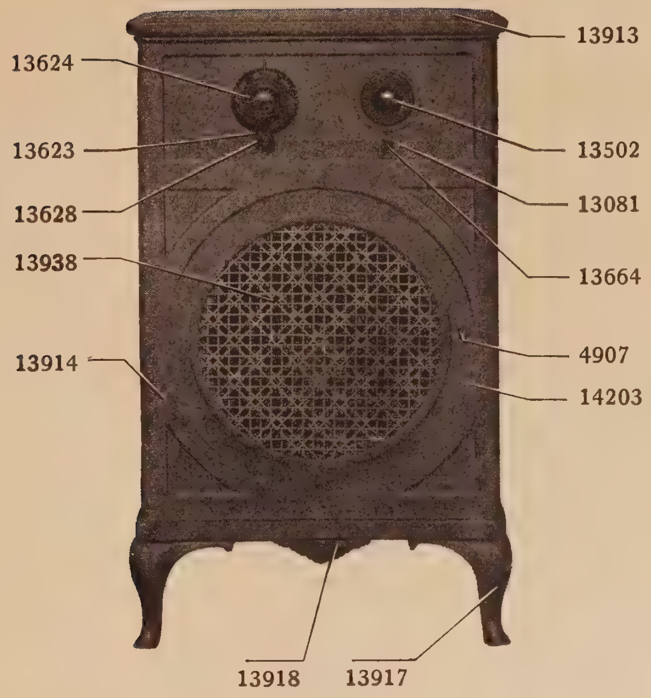
13507 POWER SUPPLY CABLE

POWER SUPPLY PARTS

NOTE:—All power supply parts for Model 52, No. 9930 set are the same as those used on Model 42, No. 9850 set and should be selected from Previous Parts Lists.

Refer to numerical list for prices.

MODEL 52, No. 9930 SET (Cont'd)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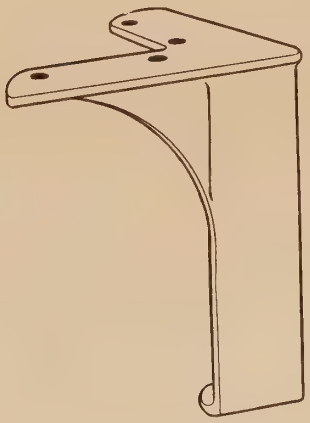
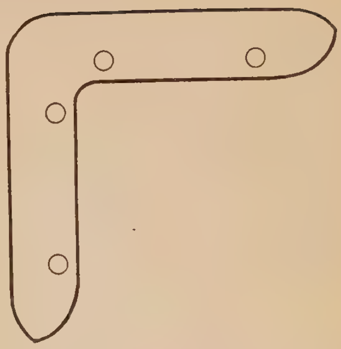
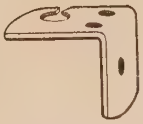


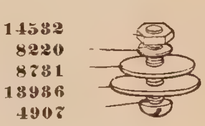
13915 STRAIGHT LEG



13916
STRAIGHT LEG GASKET



13937 WIRE CLAMP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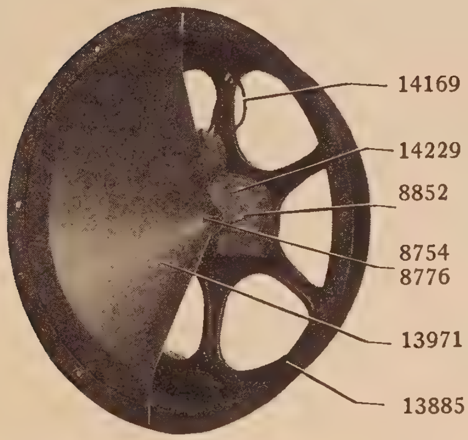
14169
14229
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8754
8776
13971
13885

13600 FLANGE SPEAKER

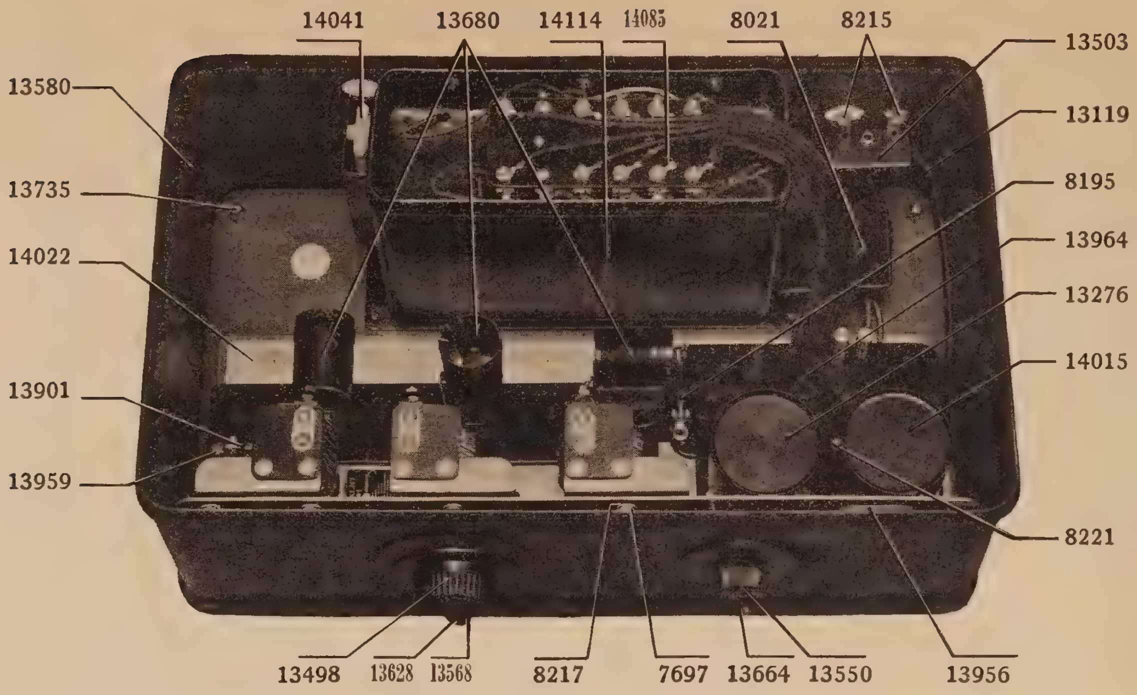
Part No.	
13885	Frame
14229	Sound Unit
14225	Dust-proof Bag
14169	Phone Cord
14512	Mounting Nut
13929	Large Washer
13931	Small Washer
13932	Mounting Washer
8752	Sound Unit Mounting Nut
13971	Diaphragm
8754	Diaphragm Spring Screw
8776	Diaphragm Spring Nut

14203 CASE (less grilles and speaker)

Part No.	
13914	Body Assembly
13081	"ON" Button
13516	Dial Indicator
8236	Name Plate
8272	Name Plate Rivet
13748	Vernier Stud
13628	Vernier Knob Screw
13915	Straight Leg
13916	Straight Leg Gasket
8729	Leg Mounting Screw
9366	Leg Mounting Nut
13917	Curved Leg
13919	Curved Leg Gasket
13918	Ornament
13938	Front or Rear Grill
4907	Grill Screw
3597	Grill Screw
13934	Rear Grill Ring
13936	Cardboard Washer
8731	Steel Washer
13935	Front Grill Ring
13913	Case Lid

Refer to Numerical list for prices.

MODEL 41, No. 9910 SET (D. C.)



13580 CABINET COMPLETE

Part No.	
13970	Cabinet Body
14022	Tube Chart
13905	"D. C." Name Plate
9206	Name Plate Rivet

Note:—Parts not listed above are the same as those used on No. 13330 cabinet for Model 40, No. 9800 set, and should be selected from previous lists.

SET PARTS

Part No.	
13961	No. 1 R. F. Bias Resistance
14039	Filter Shunt Resistance
13955	Double By-pass Condenser
7697	Mounting Screw
8220	Mounting Lockwasher
8221	Mounting Nut
13956	Single Bypass Condenser
13901	No. 1 R. F. Plate Resistance
13959	Resistance Base
9689	Resistance Base Mounting Screw
4822	Resistance Base Mounting Lockwasher
14008	Literature Assembly
14005	Instruction Book
14007	Shipping Container

Note:—Many parts for Model 41, No. 9910 D. C. set are the same as those used in Model 40, No. 9800 A. C. set and should be selected from previous lists.

14071 DETECTOR AND 2-STAGE AMPLIFIER

Part No.	
13964	Detector and 2-Stage Base
8215	Phone Post
9337	Phone Post Screw
9678	Solder Clip
8195	Grid Leak
14072	Phone Condenser
13276	No. 1 A. F. Transformer
14015	No. 2 A. F. Transformer

14085 POWER SUPPLY CABLE

Part No.	
13509	Cable Sleeve
14084	Cable Connection Panel

13680 RADIO FREQUENCY AMPLIFIER

13550 VOLUME CONTROL UNIT

Part No.	
14024	Lead (red)
14025	Lead (black)
14026	Cable, Bracket and Post Assembly

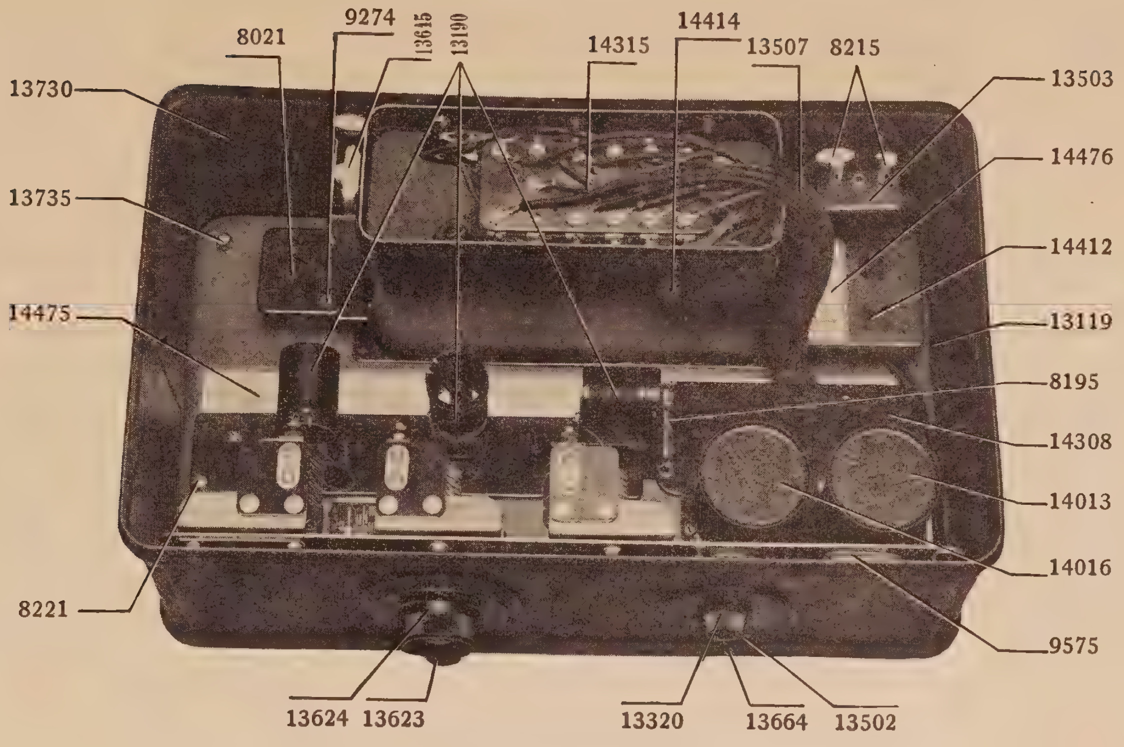
Note:—Parts not listed above will be found under No. 13320 Volume Control unit for Model 40, No. 9800 A. C. Set.

POWER SUPPLY PARTS

Part No.	
14114	Transformer, Condenser and Choke Assembly
8021	Tube Socket
9274	Tube Socket Mounting Screw
14041	Voltage Regulator
14042	No. 1 R. F. Choke
14471	No. 2 R. F. Choke
9829	Double Conductor Cord and Plug
8956	Attachment Plug
13664	Toggle Switch
13966	Panel Assembly
14138	Panel and Resistance Holders
9678	Solder Clip
9741	Solder Clip
9424	Detector Plate Resistance
13556	Lid

Refer to numerical list for prices.

MODEL 43, No. 9870 SET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14475
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8195
14308
14013
14016
8221
9575
13624
13623
13320
13664
13502

13730 CABINET COMPLETE

Part No.	
14475	Tube Chart........................

NOTE:—All other parts for No. 13730 Cabinet will be found under No. 13370 Cabinet for Model 42, No. 9850 set.

SET PARTS

14516	Double By-pass Condenser............
13170	Var. Cond. Group.....................
14302	Instruction Book.....................
13621	Literature Assembly..................
14299	Shipping Container..................

NOTE:—All other set parts should be selected from Model 42, No. 9850 set.

13190 R. F. AMPLIFIER..................

13320 VOLUME CONTROL................

NOTE:—See Model 40—No. 9800 set for parts.

Part No.	
14315	POWER SUPPLY CABLE & PANEL
13506	Cable Connection Panel..............
13507	Cable Sleeve........................

14314 DETECTOR AND 2-STAGE AMPLIFIER..........................

14308	Detector and 2-Stage Base............
14016	No. 1 A. F. Transformer..............
14013	No. 2 A. F. Transformer..............

NOTE:—All other parts are the same as used on 13363 Det. and 2-stage amplifier for Model 42, No. 9850 set.

POWER SUPPLY PARTS

14414	Transf., Cond. and Choke Assem.......
13645	Automatic Voltage Control............
8021	Rectifying Tube Socket...............
14412	Speaker Plug Socket..................
9274	Mounting Screw.......................
8220	Lockwasher...........................
9829	Double Conductor Cord and Plug......
8956	Attachment Plug......................
14421	Panel Assembly.......................
13534	Panel and Resis. Holders.............
13502	Panel Screw..........................
9689	Panel Screw..........................
7697	Panel Screw..........................
14427	Bias Resistance......................
13556	Lid..................................
14476	Speaker Plug Card....................
9424	A. F. Resis..........................
13047	Detector Resis.......................

Refer to numerical list for prices.

MODEL 40F, No. 9960 SET, 25 CYCLES

NOTE:—All parts used in Model 40 F, No. 9960 set are the same as those used in Model 40, No. 9800 set with the following exceptions:—

Part No.	
13590	Cabinet Complete
13991	Cabinet Body
14187	Literature Assembly

Part No.	
14194	Shipping Container
14295	Transf., Cond. and Choke Assem.
14262	Mounting Strap Assem.
13728	Mounting Strap Only
13813	Power Supply Cover
13163	"25-cycle" Name Plate

MODEL 42F, No. 9970 SET, 25 CYCLES

NOTE:—All parts used in Model 42F—No. 9970 set are the same as those used in Model 42, No. 9850 set, with the following exceptions:—

Part No.	
14187	Literature Assembly
14188	Shipping Container

Part No.	
13660	Cabinet Complete
13996	Cabinet Body
13163	"25-cycle" Name Plate
14258	Transf. Cond. and Choke Assem.
13728	Mounting Strap Only
13813	Power Supply Cover

MODEL 44F, No. 9980 SET, 25 CYCLES

NOTE:—All parts used in Model 44F—No. 9980 set are the same as those used in Model 44—No. 9900 set, with the following exceptions:—

Part No.	
14187	Literature Assembly
14193	Shipping Container

Part No.	
13670	Cabinet Complete
13997	Cabinet Body
13163	"25-cycle" Name Plate
14292	Transf., Cond. and Choke Assem.
13728	Mounting Strap Only
13813	Power Supply Cover

MODEL E-3, FLANGE SPEAKER, No. 13500

Part No.	
13848	Frame
13985	Sound Unit
8852	Terminal Nut
14225	Dust Proof Bag
4767	Speaker Cord

Part No.	
13982	Sound Unit Nut
14508	Diaphragm
13852	Steel Ring
14393	Mounting Nut
14474	Shipping Container

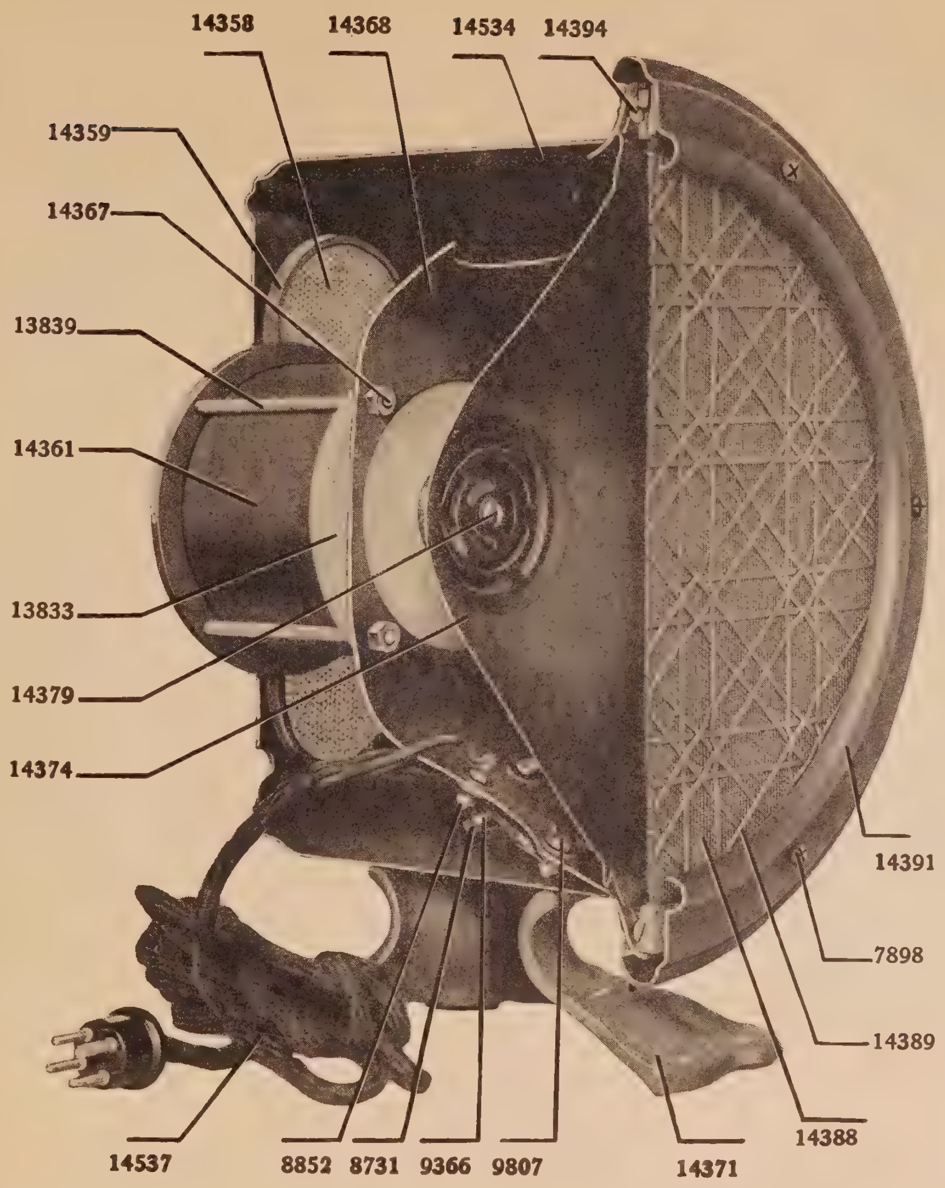
MODEL E-3, LUG SPEAKER, No. 13650

Part No.	
13886	Frame
13985	Sound Unit
14225	Dust Proof Bag
8852	Terminal Nut
4767	Speaker Cord

Part No.	
13982	Sound Unit Nut
13796	Diaphragm
13798	Front Grill Complete
9205	Front Retaining Screw
13988	Shipping Container

Refer to numerical list for prices.

MODEL F, No. 9890 SPEAKER (ELECTRO-DYNAMIC)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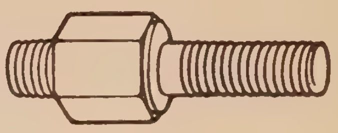
8852
8731
9366
9807
14371


14365
Stud Spacer

Part No.	
14534	Frame ....
14371	Base..................................
8976	Base Screw.........................
8731	Base Washer ....
9366	Base Nut ....
14358	Back Screen........................
14359	Retaining Ring ....
14368	Cone Housing......................
9807	Mtg. Screw ....
14396	Washer ....
9678	Solder Clip..........................
8753	Solder Clip..........................
8852	Mounting Nut......................
14361	Coil and Case Assembly ....
13833	Centering Plate....................
13839	Mounting Bolt.......... ....
13928	Mounting Washer.................

Part No.	
14367	Mounting Nut......................
14537	Cable and Plug Assembly ....
14374	Diaphragm Assembly................
14379	Center Screw.......................
14381	Center Washer......................
14382	Steel Ring...........................
14394	Flat Head Screw....................
14383	Cardboard Ring ....
14384	Cardboard Ring ....
14388	Front Screen and Ring ....
14389	Grill..................................
14391	Front Cover.........................
7898	Mtg. Screw..........................
14392	Stud Spacer Nut (Acorn) ....
14492	Shipping Container.................
14622	Diaphragm Coil Centering Gauge (3 required)......................

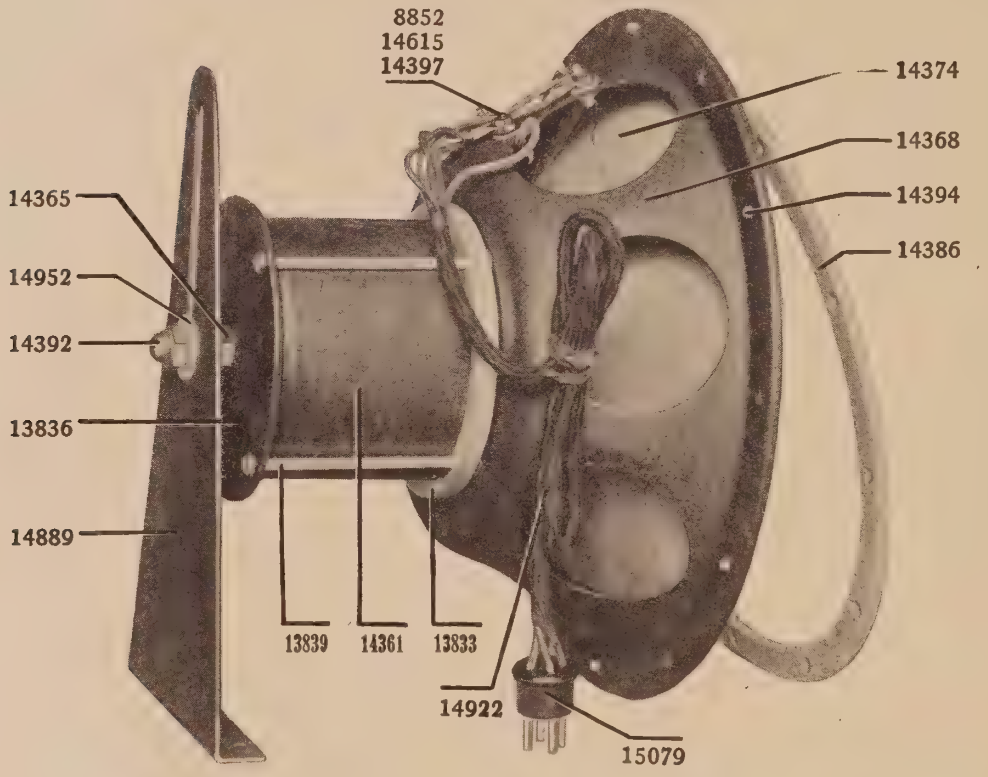
Refer to Numerical list for prices.

MODEL F-2, No. 14200 ELECTRO-DYNAMIC SPEAKER

Part No.	
14768	Shipping Container
14365	Stud Spacer
14615	Screw
14497	Screw
15079	Speaker Plug

NOTE:—All other parts for model **F-2** Speaker will be found under Model **F**, No. 9890 Speaker, on page 43.

MODEL F-2C, No. 14300 SPEAKER (ELECTRO-DYNAMIC)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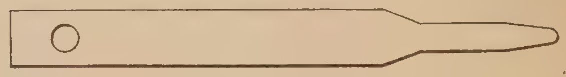
14386
14365
14952
14392
13836
14889
13839
14361
13833
14922
15079

NOTE:—All parts not listed below will be found under Model **F**, No. 9890 Speaker, on page 43.

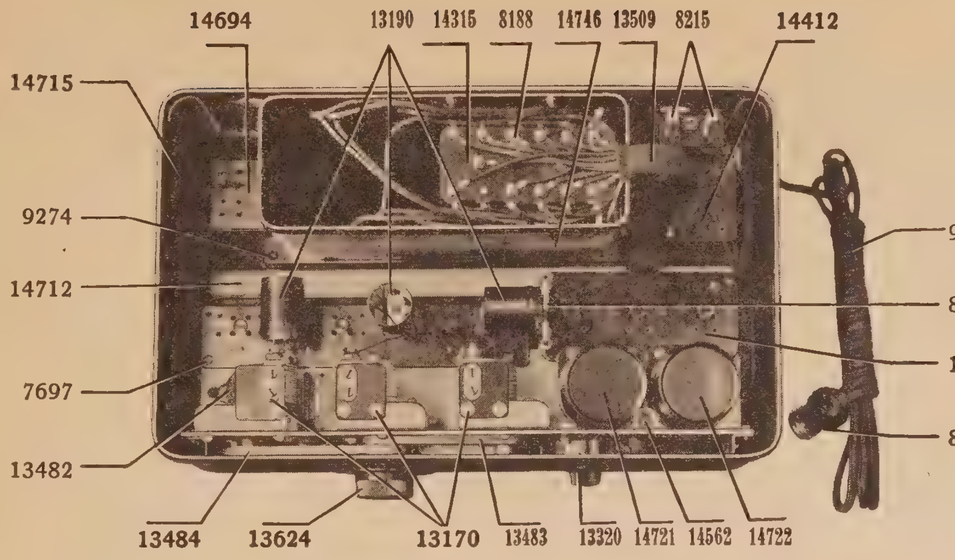
Part No.	
14397	Insulation Bushing
14615	Screw
14365	Stud Spacer
13836	Back Plate
14922	Cable and Plug Assembly
14386	Cardboard Ring
14769	Shipping Container
14889	Mounting Bracket
14952	Washer
15079	Speaker Plug

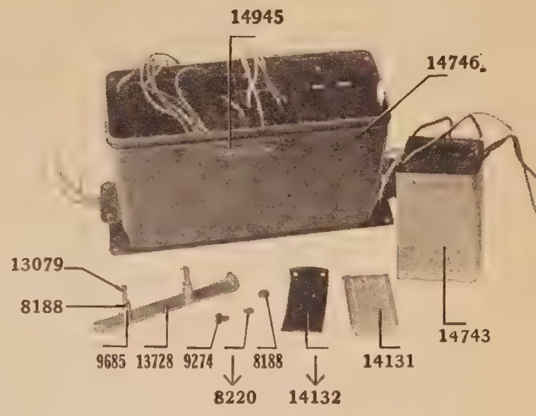


14622
DIAPHRAGM COIL CENTERING GAUGE

Refer to Numerical list for prices.

MODEL 46, No. 14100 SET (ELECTRO-DYNAMIC)





NOTE:—All parts not listed under Model 46, No. 14100 Set, will be found under Model 43, No. 9870 Set, on page 41.

SET PARTS

Part No.	
13369	R. F. Plate Resistance
14562	Detector and 2-Stage Amplifier Retaining Washer
14516	Double By-pass Condenser
13482	Antenna Coupling Transformer
13170	Variable Condenser Group
14767	Instruction Book
14709	Literature Assembly
13989	Ground Clamp Assembly
9123	Tube Cap
14766	Shipping Container
14861	Grid Condenser

13880 CABINET, COMPLETE

Part No.	
14715	Cabinet Body
13635	Lid, Complete
14712	Tube Chart

NOTE:—For other parts of 13880 Cabinet, refer to No. 13370 Cabinet on page 36.

13320 VOLUME CONTROL UNIT

Part No.	
14857	Contact Arm

NOTE:—For other parts of No. 13320 Vol. control unit see page 35.

14723 DETECTOR AND 2-STAGE AMPLIFIER

Part No.	
14308	Base and Springs
14721	No. 1 A. F. Transformer
14722	No. 2 A. F. Transformer
8195	Grid Leak
8221	Transformer Mounting Screw
9598	Phone Condenser

POWER SUPPLY PARTS

Part No.	
14746	Transformer, Condenser and Choke Assembly
14743	Condenser Assembly
14945	Transformer and Choke Assembly
14131	Clamp Support
14132	Clamp
8188	Clamp Mounting Nut
14262	Mounting Strap Assembly
13728	Mounting Strap only
13079	Mounting Strap Screw
9685	Mounting Strap Bushing
14412	Speaker Plug Socket
14694	Rectifier Tube Socket
14738	Speaker Plug Chart
14494	Black with Green Tracer Lead
14495	Red with Green Tracer Lead
13407	White Lead
14432	Green with Yellow Tracer Lead
14569	Insulating Sleeve
9829	Double Conductor Cord and Plug
8956	Attachment Plug
13664	Toggle Switch
14736	Paper Insulating Tube
14587	Panel Assembly, Complete
14586	Panel Only
14427	Bias Resistance
14565	Detector Resistance
14575	A. F. Resistance
14753	Power Supply Cover

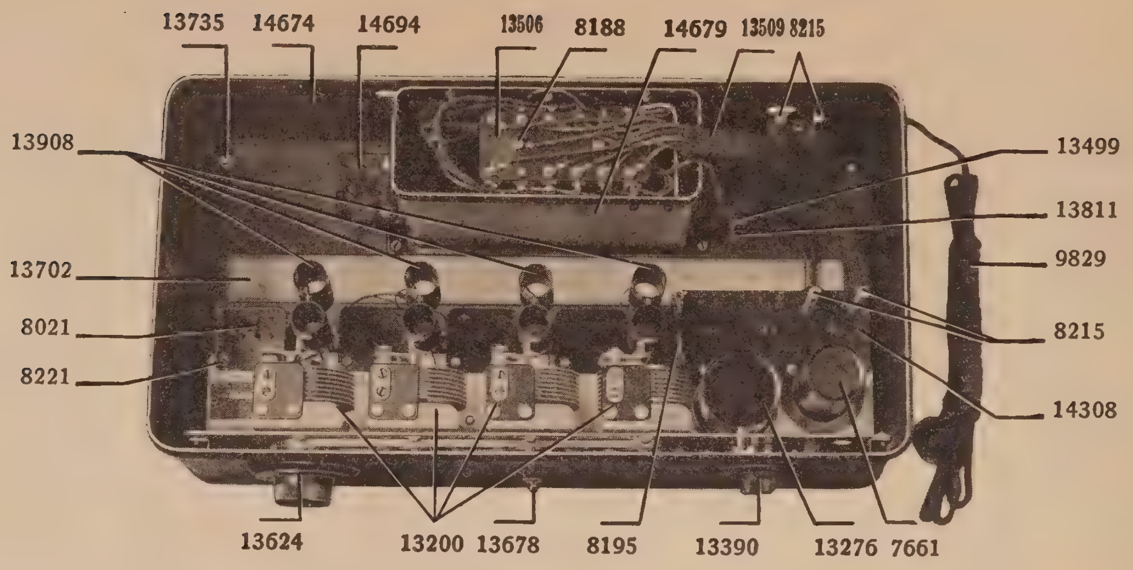
14315 POWER SUPPLY CABLE AND PANEL

Part No.	
13506	Cable Connection Panel
13509	Cable Sleeve

13190 R. F. AMPLIFIER

Refer to Numerical list for prices.

MODEL 45, No. 9880 SET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13908
13702
8021
8221
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13811
9829
8215
14308
13624
13200
13678
8195
13390
13276
7661

NOTE:—Any parts not listed under Model 45, No. 9880 Set, will be found under Model 44, No. 9900 Set, on page 37.

13810 CABINET, COMPLETE

Part No.	
14674	Cabinet Body........................
13701	Lid, Complete.......................
13702	Tube Chart..........................

SET PARTS

Part No.	
14562	Detector 2-Stage Retaining Washer....
13492	Literature Assembly.................
14304	Shipping Container..................
13989	Ground Clamp........................

13363 DETECTOR AND TWO-STAGE AMPLIFIER

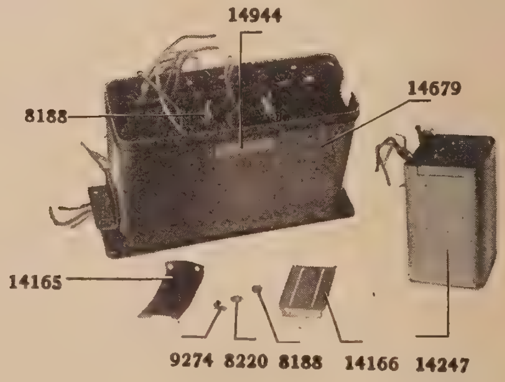
NOTE:—See Model 37 set, No. 9500, on page 27, for parts of 13363 detector and 2-stage amplifier.

13743 POWER SUPPLY CABLE AND PANEL

13908 R. F. COIL GROUP

13390 VOLUME CONTROL UNIT

Part No.	
14857	Contact Arm, Complete..............
15115	Contact Arm Adjustment Gauge......

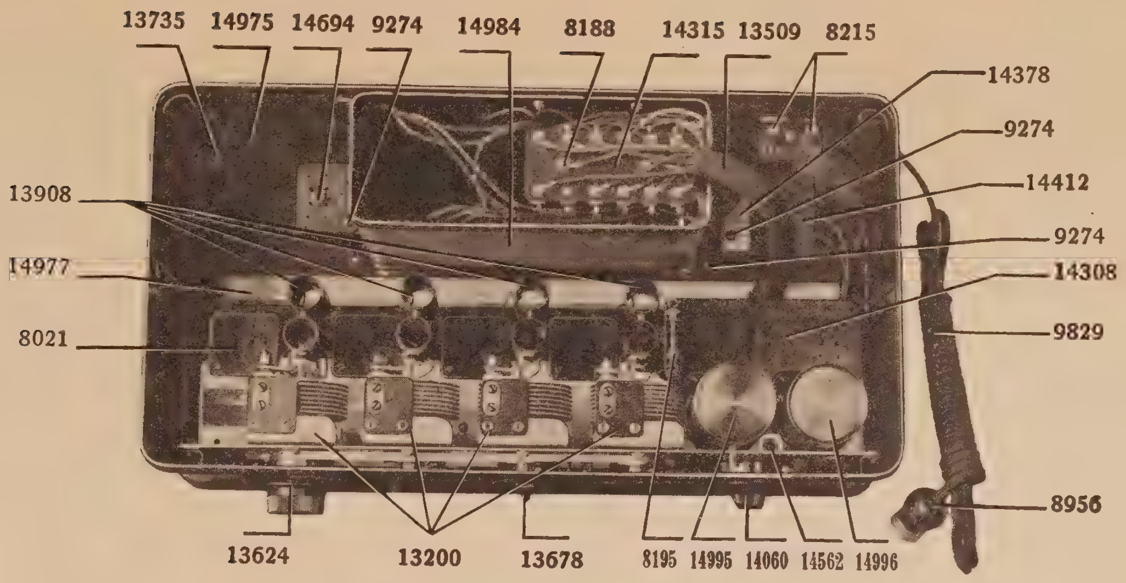

14944
14679
8188
14165
9274
8220
8188
14166
14247

POWER SUPPLY PARTS

14679	Transformer, Condenser and Choke Assembly........................
14247	Condenser Assembly.................
14944	Transformer and Choke Assembly....
14165	Clamp..............................
14166	Clamp Support......................
14694	Tube Socket........................

Refer to Numerical list for prices.

MODEL 47, No. 14500 SET



NOTE:—All parts not listed under Model 47, No. 14500 Set, will be found under Model 44, No. 9900 Set, on page 37.

14020 CABINET, COMPLETE............

Part No.	
14975	Cabinet Body......................
13701	Cabinet Lid........................
14977	Tube Chart........................

14997 DETECTOR AND 2-STAGE AMPLIFIER

Part No.	
14562	Retaining Washer..................
14308	Detector and 2-Stage Base............
14995	No. 1. A. F. Transformer............
14996	No. 2 A. F. Transformer.............

NOTE:—All other parts for No. 14997 Det. 2-stage will be found on page 27.

SET PARTS

Part No.	
13908	R. F. Coil Group....................
13688	Wiring Assembly....................
13678	3-Pole Toggle Switch...............
15008	Literature Assembly................
13989	Ground Clamp Assembly............
15011	Shipping Container................
13369	R. F. Plate Resistance.............
13668	Antenna Coupling Transformer.......
14999	Double By-pass Condenser..........
14074	Variable Condenser Group...........

POWER SUPPLY PARTS

Part No.	
9829	Double Conductor Cord and Plug......
14262	Mounting Strap Assembly............
13728	Strap Only.........................
13079	Strap Screw........................
9685	Strap Bushing......................
14586	Panel Only.........................
15063	Bias Resistance.....................
14565	Detector Resistance.................
14575	A. F. Resistance....................
13813	Power Supply Cover.................
14587	Panel Assembly.....................
14984	Transformer Condenser and Choke Assembly..........................
14951	Transformer and Choke Assembly.....
14743	Condenser Assembly................
14132	Clamp.............................
14131	Clamp Support.....................
14694	Tube Socket.......................
14412	Speaker Plug Socket................
14738	Speaker Plug Chart.................

14315 POWER SUPPLY CABLE AND PANEL

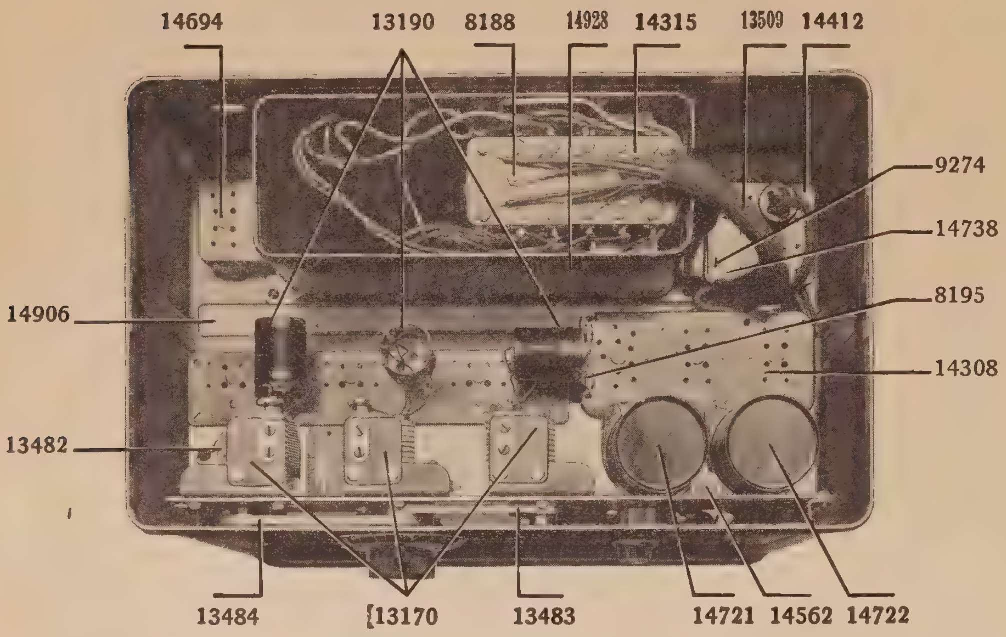
14060 VOLUME CONTROL UNIT........

Part No.	
15039	Mounting Screw....................
14857	Contact Arm, Complete..............
14992	Antenna and Ground Base Assembly..

NOTE:—All other parts for No. 14060 Vol. control unit will be found on page 37.

Refer to Numerical list for prices.

MODEL 53, No. 13100 SET (ELECTRO-DYNAMIC)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13190
8188
14928
14315
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9274
14738
8195
14308
14906
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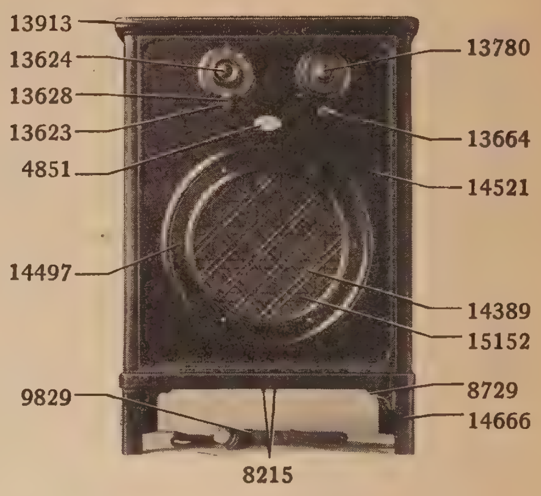
13170
13483
14721
14562
14722


13913
13624
13628
13623
4851
14497
9829
13780
13664
14521
14389
15152
8729
14666
8215

NOTE:—All other parts not listed below will be found under Model 46, No. 14100 set, on page 45.

SET PARTS

Part No.	
13989	Ground Clamp Assembly
14911	Literature Assembly
14912	Shipping Container
14477	Wooden Top Brace
14478	Wooden Bottom Brace

13190 R. F. AMPLIFIER

13780 VOLUME CONTROL UNIT

Part No.	
14857	Contact Arm, Complete
13607	Yellow Lead
14644	Red Lead
14507	Green Lead
14642	Antenna Cable
14643	Ground Cable
13946	Terminal
13395	Terminal
13937	Wire Clamp
8215	Binding Post
14636	Binding Post Base
14646	Antenna and Ground Cable Assembly
14647	Antenna and Ground Assembly, Comp.

14723 DETECTOR AND 2-STAGE AMPLIFIER

NOTE:—See Model 46, No. 14100 Set, on page 45.

14315 POWER SUPPLY CABLE AND PANEL

14915 CONSOLE (less grilles and speaker)

Part No.	
14521	Body Assembly
14916	Mounting Strap Screw
14528	Mounting Strap
14666	Leg
14853	Leg Gasket
8729	Leg Screw
13913	Lid
15152	Front Screen
14386	Front Screen Ring
14389	Front Grill
14384	Front Grill Ring
14497	Grill Screw
14532	Grill Nut
14895	Lockwasher
14942	Grill Nut
14906	Tube Chart

13990 ELECTRO-DYNAMIC SPEAKER

NOTE:—See Model F, No. 9890 speaker on page 43 for parts.

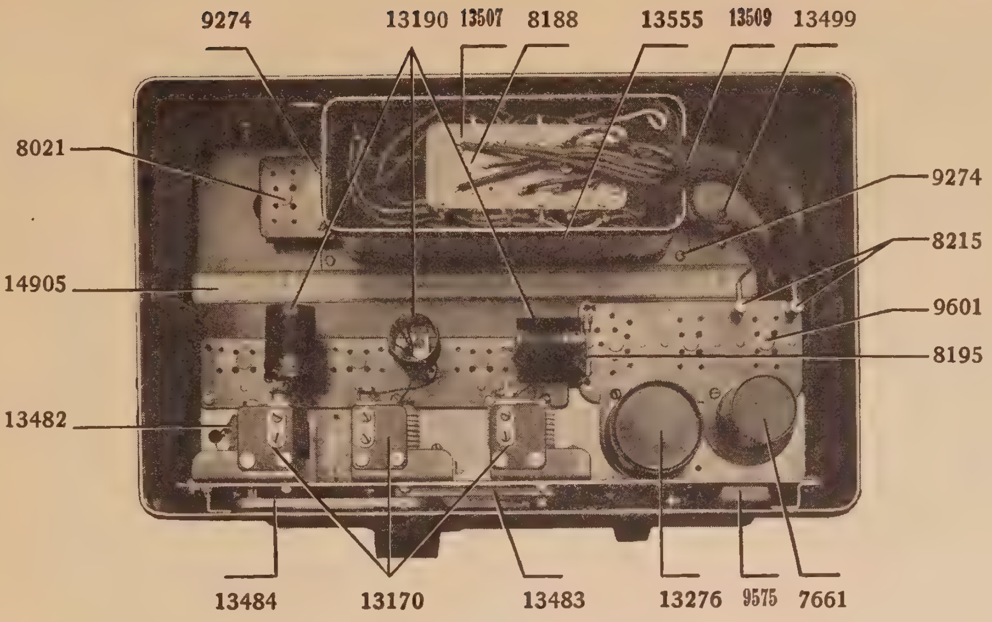
POWER SUPPLY PARTS

Part No.	
14928	Transformer, Condenser and Choke Assembly
14926	Condenser Assembly
14949	Transformer and Choke Assembly
14262	Mounting Strap Assembly
13728	Strap Only
13079	Strap Screw
9685	Strap Bushing

NOTE:—All parts not listed above will be found under Model 46, No. 14100 Set, on page 45.

Refer to Numerical list for prices.

MODEL 56, No. 13900 SET



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13190
13507
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9274
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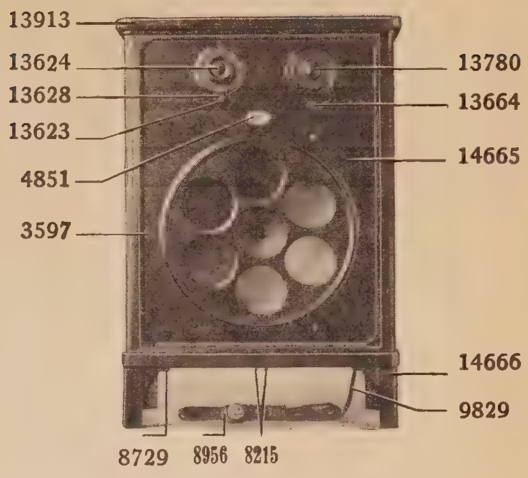
13276
9575
7661



13913
13624
13628
13623
4851
3597
13780
13664
14665
14666
9829
8729
8956
8215

NOTE:—All other parts for Model 56, No. 13900 Set, will be found under Model 40, No. 9800 Set, on page 35.

SET PARTS

Part No.	
14905	Tube Chart........................
14658	Literature Assembly................
14477	Wooden Top Brace..................
14478	Wooden Bottom Brace...............
13989	Ground Clamp Assembly.............
14659	Shipping Container.................

13780 VOLUME CONTROL UNIT........

Part No.	
14857	Contact Arm, Complete..............
13607	Yellow Lead........................
14644	Red Lead...........................
14507	Green Lead.........................
14642	Antenna Cable......................
14643	Ground Cable.......................
13946	Terminal...........................
13395	Terminal...........................
13937	Wire Clamp.........................
8215	Binding Post.......................
14636	Binding Post Base..................
14646	Antenna and Ground Cable Assembly..
14647	Antenna and Ground Assembly, Comp.

13363 DETECTOR AND 2-STAGE AMPLIFIER

NOTE:—See Model 37, No. 9500 Set, on page 27.

14667 CONSOLE (less Speaker)...........

Part No.	
14665	Body Assembly......................
14666	Straight Leg.......................
14853	Straight Leg Gasket................

NOTE:—All parts not listed above will be found under Model 52, No. 9930 Set, on page 39.

13190 R. F. AMPLIFIER................

13600 FLANGE SPEAKER...............

NOTE:—See Model 52, No. 9930 Set, on page 39.

13507 POWER SUPPLY CABLE AND PANEL........................

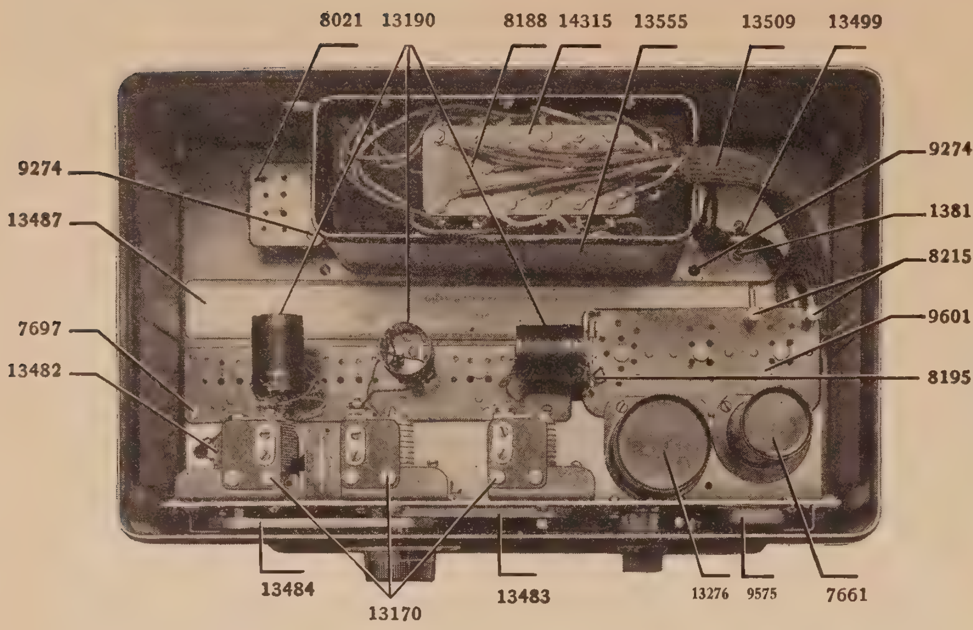
POWER SUPPLY PARTS

NOTE:—See Model 40, No. 9800 Set, on page 35.

February 1, 1929

Refer to Numerical list for prices.

MODEL 57, No. 14000 SET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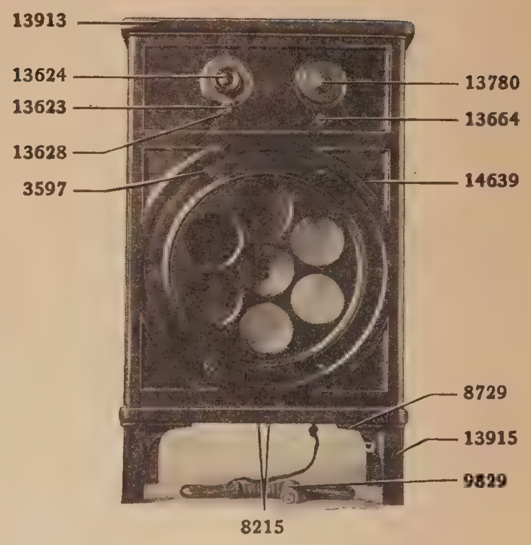
13276
9575
7661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3597
13780
13664
14639
8729
13915
9829
8215

NOTE:—All other parts for Model 57, No. 14000 Set, will be found under Model 40, No. 9800 Set, on page 35.

SET PARTS

Part No.	
13487	Tube Chart........................
14655	Literature Assembly................
14652	Shipping Container.................
13989	Ground Clamp Assembly............
14477	Wooden Top Brace.................
14478	Wooden Bottom Brace..............

13780 VOLUME CONTROL UNIT

Part No.	
14857	Contact Arm, Complete.............
13607	Yellow Lead........................
14644	Red Lead..........................
14507	Green Lead........................
14642	Antenna Cable.....................
14643	Ground Cable......................
13946	Terminal..........................
13395	Terminal..........................
13937	Wire Clamp........................
8215	Binding Post......................
14636	Binding Post Base..................
14646	Antenna and Ground Cable Assembly
14647	Antenna and Ground Assembly, Comp.

13363 DETECTOR AND TWO-STAGE AMPLIFIER

NOTE:—See Model 37, No. 9500 Set, on page 27.

14641 CONSOLE (less Speaker)............

Part No.	
13519	Nameplate.........................
14639	Cabinet Body only ....

NOTE:—All parts not listed above will be found under Model 52, No. 9930 Set, on page 39.

13600 FLANGE SPEAKER...............

NOTE:—See Model 52, No. 9930 Set, on page 39.

14315 POWER SUPPLY CABLE AND PANEL

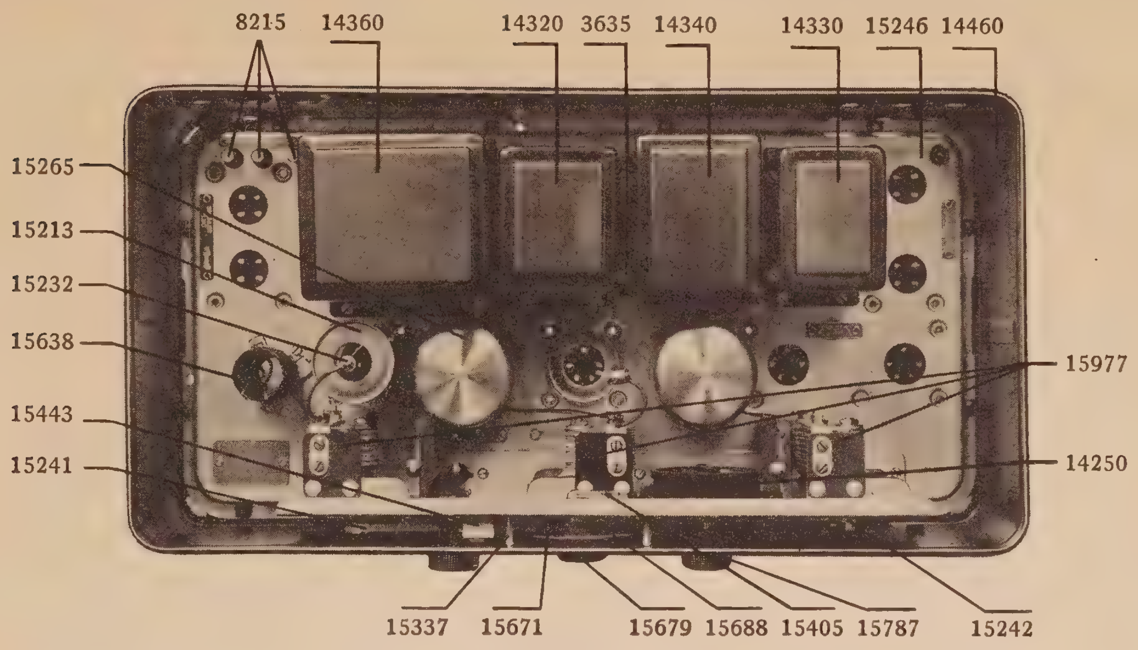
13190 R. F. AMPLIFIER................

POWER SUPPLY PARTS

NOTE:—See Model 40, No. 9800 Set, on page 35.

Refer to Numerical list for prices.

MODEL 55, No. 14900 SCREEN-GRID SET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14460
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15232
15638
15443
15241
15977
14250
15337
15671
15679
15688
15405
15787
15242

14460 CABINET ASSEMBLY, COMPLETE

Part No.	
15692	Body Assembly
13701	Lid

FINAL BASE ASSEMBLY

Part No.	
15638	R. F. Coil Group
15265	R. F. Coil Shield
15213	Tube Shield
14360	Power Trans. Unit
14340	Condenser Unit
14320	Filter Choke Unit
14330	In and Output Unit
15327	Condenser Unit Container
15833	Condenser Unit Spring
15834	Condenser Unit Spacer
15332	Condenser Unit Lid
15329	Trans. Unit Lid
15331	Choke Unit Lid
15333	In and Output Unit Lid
15415	Bottom Plate, Complete

MAIN PANEL ASSEMBLY

Part No.	
15228	Panel Only
15337	Panel Spacer Bushing
15279	Panel Spacer Screw
15776	Dial Adj. Support
15237	Angle Shield
15369	Top Shield
15232	Grid Cap

LAMP SOCKET ASSEMBLY

Part No.	
15405	Socket Assembly
15404	Lamp
15747	Resistance Lead
15643	Mounting Lockwasher

VARIABLE CONDENSER ASSEMBLY

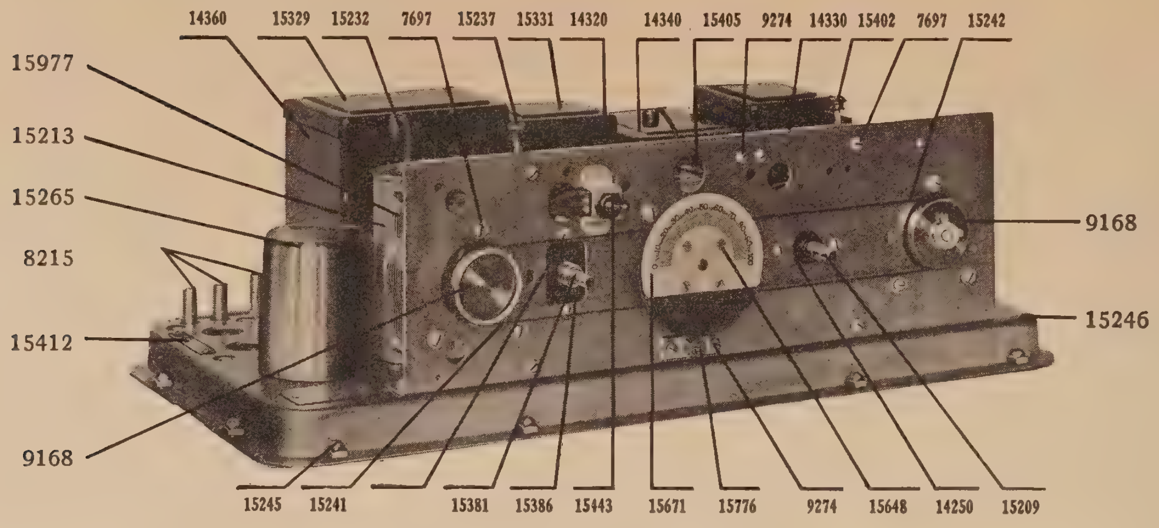
Part No.	
15977	Condenser Group
15686	No. 2 Pulley
15688	Dial Gear
15671	Dial Vision Plate
15648	Dial Mounting Screw
15241	Short Belt
15242	Long Belt

15386 DISTANCE SWITCH ASSEMBLY . . .

Part No.	
15383	Base
15381	Shaft
15374	Contact Blade
14788	Mounting Screw
15742	Lead (Yellow)
15446	Lead (Blue)
15447	Lead (Red-White Tracer)

Refer to numerical list for prices.

MODEL 55, No. 14900 SCREEN-GRID SET (Cont'd)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15265
8215
15412
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15246
15245
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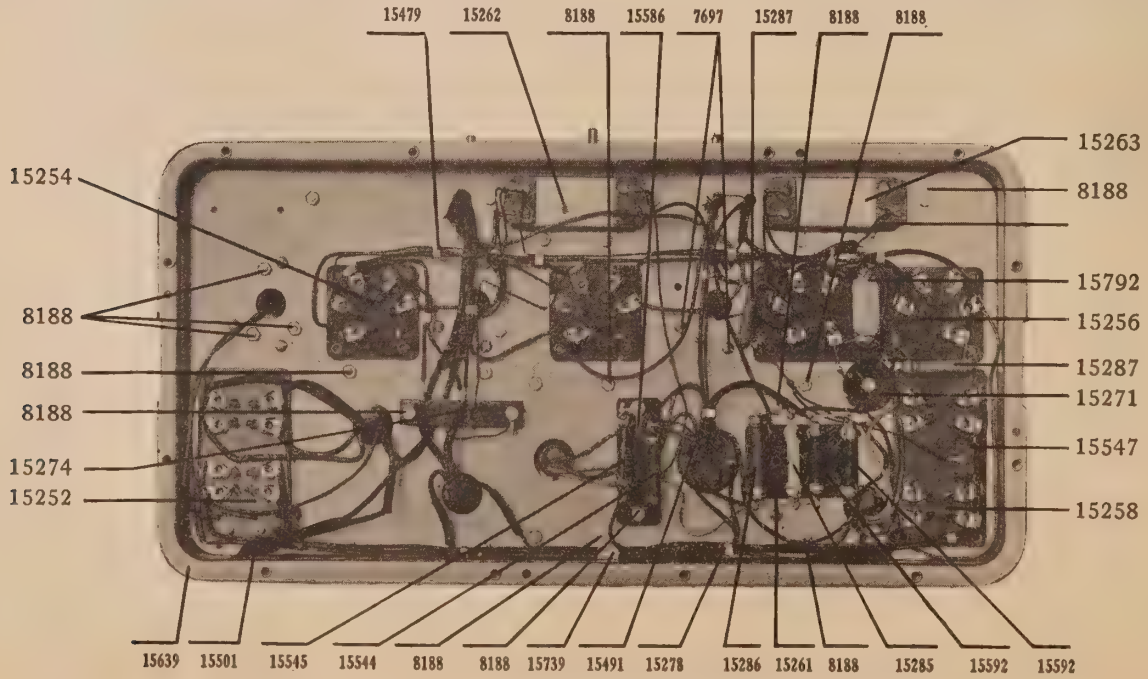
15381
15386
15443
15671
15776
9274
15648
14250
15209

SUB-BASE ASSEMBLY

Part No.	
15246	Base Plate Only
15639	Base Plate, Sockets, Nameplates
15245	Base Nut, Round Head
15252	Rect. and Speaker Plug Socket
15254	R. F. Socket
15256	Det. and 1st. A. F. Socket
15258	2nd A. F. Socket
15214	Tube Shield Base
15261	Four Resis. Base
15586	Two Resis. Base
15283	Ant. Post Screw
15587	Ant. and Grd. Plate
15408	R. F. Tube Plate
15409	Det. Tube Plate
15411	Power Tube Plate
15412	Rect. and Speaker Plug Plate
15278	Output Group Leads
15491	Resistance Group Leads
15479	Filament Group Leads
15739	Wire Clamp
15262	R. F. By-pass
15263	Det. By-pass
15792	Phone Condenser
15271	R. F. Choke
15272	1st A. F. Cathode Series Resis.
15274	R. F. Fil. Shunt and Bias Resis.
15904	R. F. Fil. Shunt Resis.
15547	2nd A. F. Fil. Shunt Resis.
15544	2nd A. F. Bias Resis., No. 2, Yellow
15545	2nd A. F. Bias Resis., No. 1, Maroon
15592	1st A. F. and Filter Resis., Black
15285	1st A. F. Plate Resis., Gray
15286	Bleeder Resis., Purple
15287	Det. Cathode Resis., Blue

Below Serial No. 3380001 Table Model and No. 4140001 Panel Model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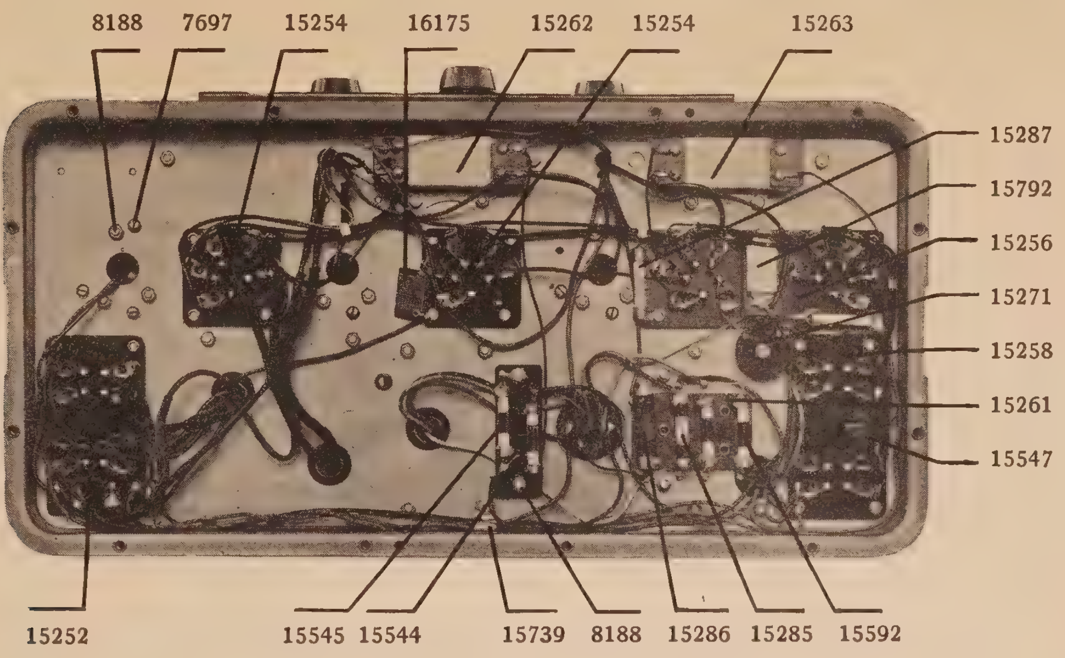
Refer to numerical list for prices.

MODEL 55, No. 14900 SCREEN-GRID SET (Cont'd)

Above Serial No. 3380001 Table Model and No. 4140001 Panel Model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15544
15739
8188
15286
15285
15592

15501 DOUBLE CONDUCTOR CORD AND PLUG

Part No.	
15499	Cord Only
8956	Plug Only

VOL. CONT. AND DIS. SWITCH KNOB

Part No.	
15787	Knob
15562	Knob Set-Screw

15443 TOGGLE SWITCH ASSEMBLY

Part No.	
13664	Toggle Switch
15373	Bracket

14250 VOLUME CONTROL UNIT

Part No.	
15211	Housing
15209	Shaft
15297	Resistance
15564	Lead (White)
15565	Lead (Red)
15566	Lead (Red-Black Tracer)

15679 DIAL KNOB ASSEMBLY

Part No.	
15678	Dial Knob Only
15681	Rubber
15682	Dial Screw
15591	Literature Assembly
15588	Instruction Book
15689	Shipping Container

MODEL 55-C, No. 14800 SCREEN-GRID SET

NOTE:—All parts not listed below will be found under Model 55, No. 14900 Set, on pages 51 and 52.

Part No.	
15676	Front Panel, Complete
15675	Front Panel Only
15705	Front Panel Brace
15766	Front Panel Brace Screw
15765	Front Panel Brace Lockwasher
15656	Bottom Plate
14470	Power Transformer Unit
15688	Shipping Container

Refer to numerical list for prices.

MODEL F-3, No. 14190 POWER SPEAKER

NOTE:—All parts not listed below will be found under Model F, No. 9890 Speaker, on page 43.

Part No.	
15135	Cone Housing Assembly
15041	Insulating Card Screw
15085	Insulating Card Solder Clip
15142	Diaphragm Assembly
15133	Diaphragm Centering Washer
15134	Diaphragm Insulating Washer
15138	Case and Coil Assembly
15631	Field Coil Only
15118	Back Plate
15139	Centering Plate Assembly
15131	Case and Coil Mounting Bolt
15627	Case and Coil Mounting Washer
15227	Cable and Plug Assembly

MODEL F-4, No. 14380 POWER SPEAKER

NOTE:—All parts not listed below will be found under Model F, No. 9890 Speaker, on page 43.

Part No.	
13843	Frame
14368	Cone Housing Assembly
15595	Case and Coil Assembly, Complete
15635	Field Coil Only
15559	Front Spacer Ring
15708	Back Plate
15193	Case and Coil Mounting Bolt
15561	Case and Coil Mounting Washer
15226	Cable and Plug Assembly
15113	Cable Connecting Card
14212	Plug Only
15579	Shipping Container

MODEL F-4C, No. 14410 POWER SPEAKER

NOTE:—All parts not listed below are same as Model F-4, No. 14380 Speaker (above).

Part No.	
15611	Cone Housing Assembly
15612	Case and Coil Assembly, Complete
15572	Back Stud
15227	Cable and Plug Assembly
15578	Shipping Container

Refer to numerical list for prices.

MODEL 55-F, No. 15600 SCREEN-GRID SET (25 CYCLE)

Note:—All parts not listed below are same as Model 55, No. 14900 Set on pages 51, 52, 53.

Part No.	
14730	Cabinet Assembly, Complete
14720	Condenser Unit
14740	Power Trans. Unit
16065	Power Trans. Unit Lid
16055	A. F. Grid Bias Resis (2 used)
16056	Fil. Shunt Resis
15881	2nd Audio Tube Plate
15997	Speaker Plug and Rect. Tube Plate
16067	Literature Assembly
16066	Instruction Book
16068	Shipping Container

MODEL 55-F-C, No. 15700 SCREEN-GRID SET (25 CYCLE)

Note:—All parts not listed below are same as Model 55-F, No. 15600 Set, above.

Part No.	
15676	Front Panel Assembly
14750	Power Trans. Unit
16069	Shipping Container

MODEL F-6, No. 14480 POWER SPEAKER

Note:—All parts not listed below will be found under Model F-4, No. 14380 Speaker, on Page 54.

Part No.	
15869	Case and Coil Assembly
15854	Field Coil Only
15142	Diaphragm Assembly
15805	Shipping Container

MODEL F-6-C, No. 14490 POWER SPEAKER

Note:—All parts not listed below will be found under Model F-4, No. 14380 Speaker, on Page 54.

Part No.	
15874	Cone Housing Assembly
15855	Case and Coil Assembly
15572	Back Stud
15227	Cable and Plug Assembly
15806	Shipping Container

MODEL F-7, No. 14510 POWER SPEAKER

Note:—All parts not listed below will be found under Model F-4, No. 14380 Speaker, on Page 54.

Part No.	
15872	Case and Coil Assembly
15863	Field Coil Only
15807	Shipping Container

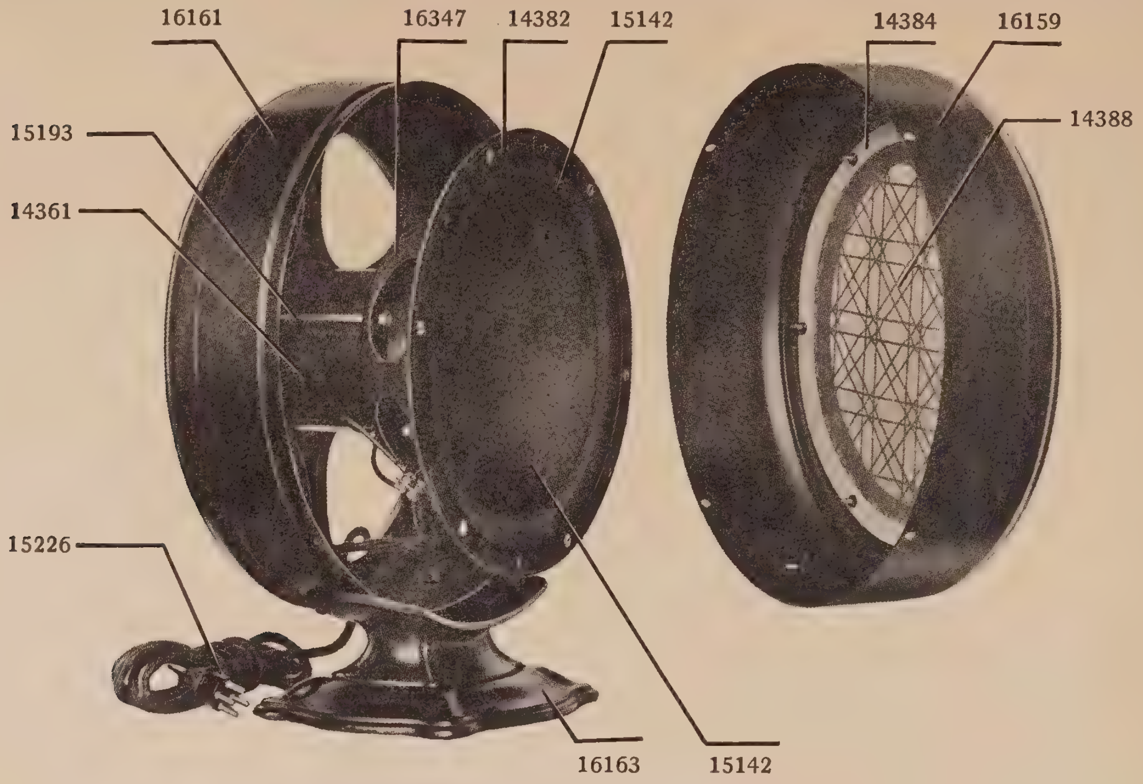
MODEL F-7-C, No. 14520 POWER SPEAKER

Note:—All parts not listed below will be found under Model F-4, No. 14380 Speaker, on Page 54.

Part No.	
15875	Cone Housing Assembly
15864	Case and Coil Assembly
15863	Field Coil Only
15227	Cable and Plug Assembly
15808	Shipping Container

Refer to numerical list for prices.

MODEL F-2-A No. 14760 POWER SPEAKER



Note:—All parts not listed below will be found under Model F, No. 9890 Speaker, on Page 43.

Part No.	
16159	Front Frame
16161	Back Frame
16448	Frame Screw
16163	Base
16347	Cone Housing Assembly
16215	Shipping Container
15142	Diaphragm Assembly

MODEL F-4-A, No. 14770 POWER SPEAKER

Note:—All parts not listed below are same as Model F-2-A, No. 14760 Speaker (above).

Part No.	
16348	Cone Housing Assembly
16131	Shipping Container

MODEL F-6-A, No. 14780 POWER SPEAKER

Note:—All parts not listed below are same as Model F-6, No. 14480 Speaker, on page 55.

Part No.	
16159	Front Frame
16161	Back Frame
16163	Base Assembly
16349	Cone Housing Assembly
16216	Shipping Container

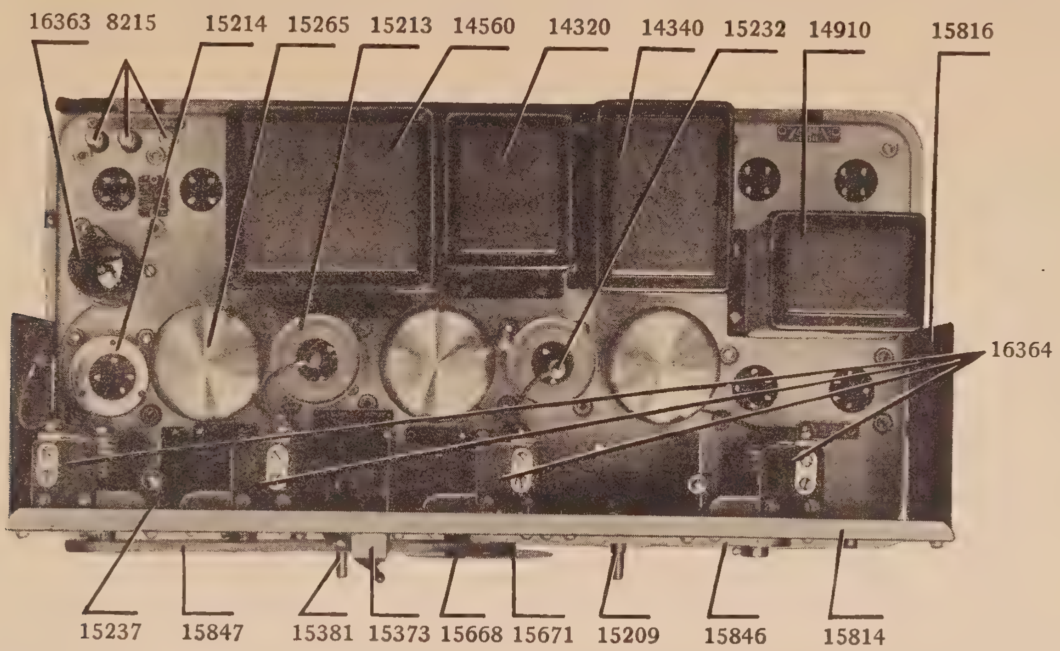
MODEL F-7-A, No. 14790 POWER SPEAKER

Note:—All parts not listed below are same as Model F-7, No. 14510 Speaker on Page 55.

Part No.	
16159	Front Frame
16161	Back Frame
16351	Cone Housing Assembly
16163	Base Assembly
16217	Shipping Container

Refer to numerical list for prices.

MODEL 60, No. 15000 SCREEN-GRID SET



Note:—All parts not listed below will be found under
Model 55, No. 14900 Set, on Pages 51, 52, 53.

14620 CABINET ASSEMBLY, COMPLETE

Part No.	
15692	Body Assembly
13701	Lid
16236	Escutcheon

FINAL BASE ASSEMBLY

Part No.	
16363	R. F. Coil Group (Used in sets below serial No. 3,100,001)
16984	R. F. Coil Group (Used in sets above serial No. 3,100,001)
15842	R. F. Coil Shield (1 used)
15265	R. F. Coil Shield (3 used)
14560	Power Trans. Unit
15876	Top Shield Support
14910	Input and Output Trans. Unit

MAIN PANEL ASSEMBLY

Part No.	
15814	Main Panel Only
15826	Angle Shield (1 used)
15237	Angle Shield (2 used)
15816	R. H. End Shield
15817	L. H. End Shield
15823	Top Shield

VARIABLE CONDENSER ASSEMBLY

Part No.	
16364	Condenser Group
15845	Short Belt
15846	Long Belt
15847	Extra Long Belt

14250 VOLUME CONTROL UNIT

(Used in sets below serial No. 3,100,001)

Note:—See Page 51.

15170 DUAL VOLUME CONTROL UNIT

(Used in sets above serial No. 3,100,001)

Part No.	
16703	Housing and No. 1 Resis. Assembly
16709	Volume Control Resis. No. 2
16706	Contact and Pressure Arm Assem.
16514	Volume Control Shaft
16642	Volume Control Shaft Washer
16576	Volume Control Cover

15443 TOGGLE SWITCH ASSEMBLY

Note:—See Page 53.

15405 LAMP SOCKET ASSEMBLY

Note:—See Page 51.

15501 DOUBLE CONDUCTOR CORD AND PLUG

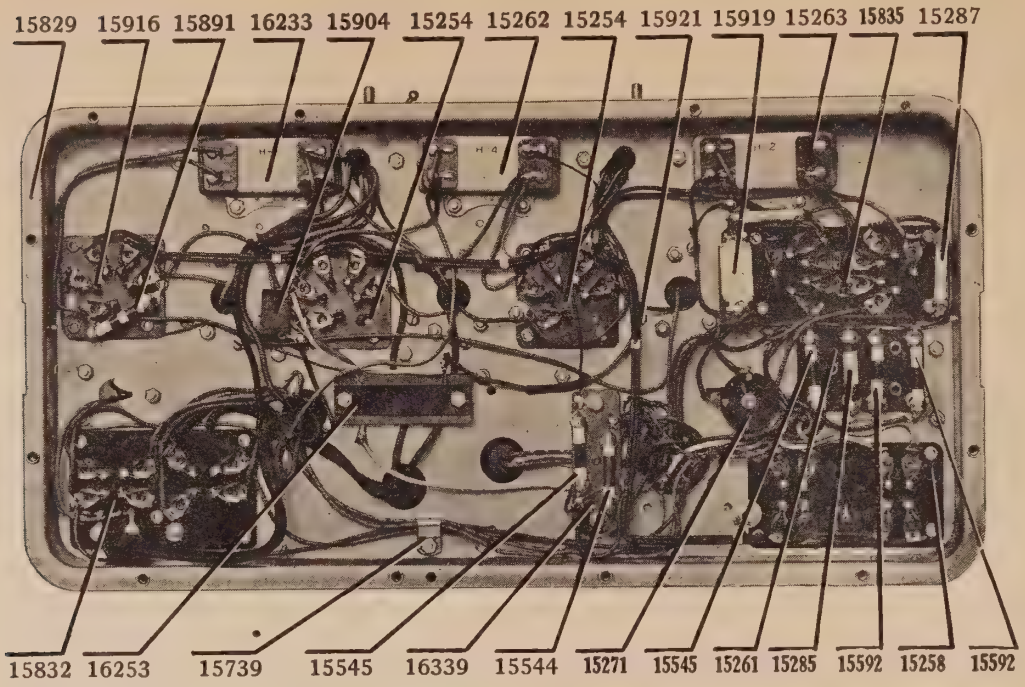
Note:—See Page 53.

SET PARTS

Part No.	
15591	Literature Assembly
15588	Instruction Book
15852	Shipping Container

Refer to numerical list for prices.

MODEL 60, No. 15000 SCREEN-GRID SET (Cont'd)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15592

SUB-BASE ASSEMBLY

Part No.	
16339	Two Resis. Base
15829	Base Plate Only
16362	Base Plate, Sockets, Nameplates
15832	Rect. and Speaker Plug Socket
15916	R. F. Socket (1 used)
15254	R. F. Socket (2 used)
15891	Screen-Grid Resis. No. 2 (black and red)
16295	Bleeder Resis.
16253	1st R. F. Bias Resis.
15835	Det.-1st Audio Socket
15804	Det.-1st Audio Nameplate
15803	Rect. and Speaker Plug Nameplate
15984	2nd Audio Nameplate
16233	No. 1 Bypass Condenser
15262	No. 2 Bypass Condenser
15263	No. 3 Bypass Condenser
15904	R. F. Grid Bias Resis.
15919	Phone Condenser
15271	R. F. Choke (1 used)
16659	R. F. Choke (3 used) (Above Serial No. 3,100,001)
16724	Resistor, white (1 used in later models)
16725	Resistor, black and yellow (1 used in later models)

15386 DISTANCE SWITCH ASSEMBLY

(Used in sets below serial No. 3,100,001)

Note:—See Page 51.

16871 DISTANCE SWITCH ASSEMBLY

(Used in sets above serial No. 3,100,001)

Part No.	
15383	Base Assembly
15381	Shaft
15374	Blade
16788	Distance Switch Condenser (Black Rubber Covered Lead)

MODEL 60-C, No. 15100 SCREEN-GRID SET

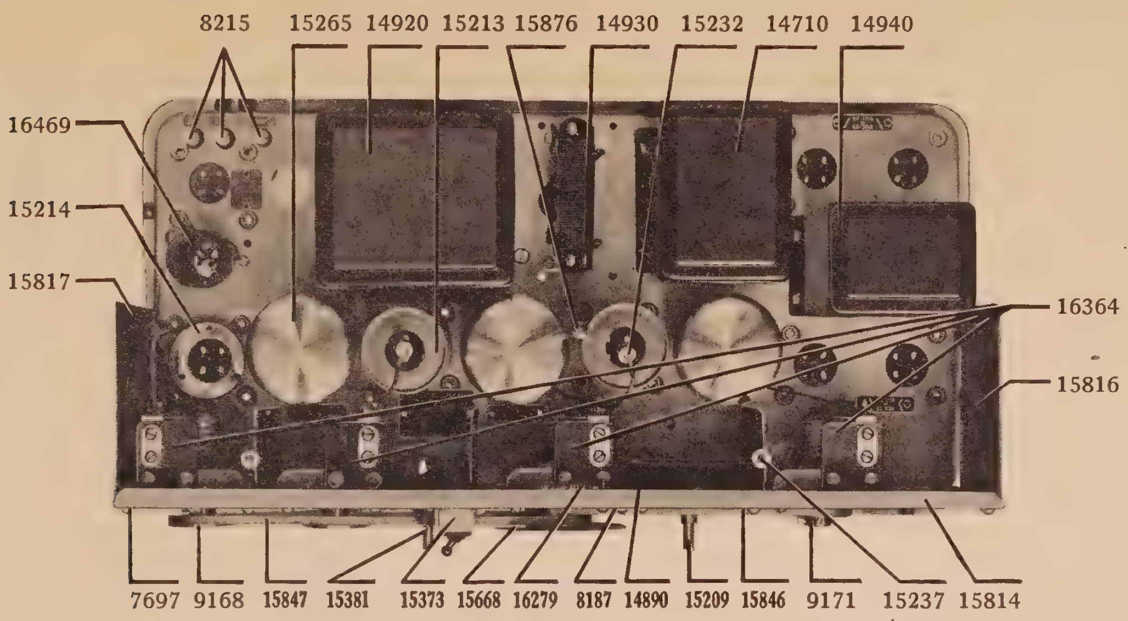
Note:—All parts for Model 60-C, No. 15100 Set are same as Model 60, No. 15000 Set with the following exceptions.

Part No.	
16241	Front Panel Assembly
16236	Escutcheon
15946	Shipping Container

Note:—Where Serial No. 3,100,001 is referred to in Model 60 Set, Serial No. 5,500,001 should be used when ordering parts for Model 60-C Set.

Refer to numerical list for prices.

MODEL 61, No. 15300 SCREEN-GRID SET (D. C.)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15668
16279
8187
14890
15209
15846
9171
15237
15814

Note:—All parts not listed below will be found under
Model 55, No. 14900 Set, on pages 51, 52, 53.

14950 CABINET ASSEMBLY, COMPLETE

Part No.	
15692	Body Assembly
13701	Lid
16238	Escutcheon

FINAL BASE ASSEMBLY

Part No.	
16469	R. F. Coil Group
15842	R. F. Coil Shield (1 used)
15265	R. F. Coil Shield (3 used)
14920	Power Choke Unit
14710	Condenser Unit
14940	Audio Unit

SET PARTS

Part No.	
16305	Literature Assembly
16246	Instruction Book
16071	Shipping Container
15679	Dial Knob Assembly
15787	Vol. Cont. and Dis. Switch Knob

14930 FILAMENT RESISTANCE ASSEMBLY

Part No.	
16432	Fil. Series Resis. No. 2
16433	Fil. Series Resis. No. 1
16434	A. F. Fil. Shunt Resis.

14890 VOLUME CONTROL UNIT

Part No.	
14857	Contact Arm
15211	Housing
15209	Shaft
15297	Resistance

LAMP SOCKET ASSEMBLY

Part No.	
16279	Socket Assembly Only
16099	Lamp

16358 TOGGLE SWITCH ASSEMBLY

Part No.	
13664	Toggle Switch Only
15373	Bracket

16364 VARIABLE CONDENSER ASSEMBLY

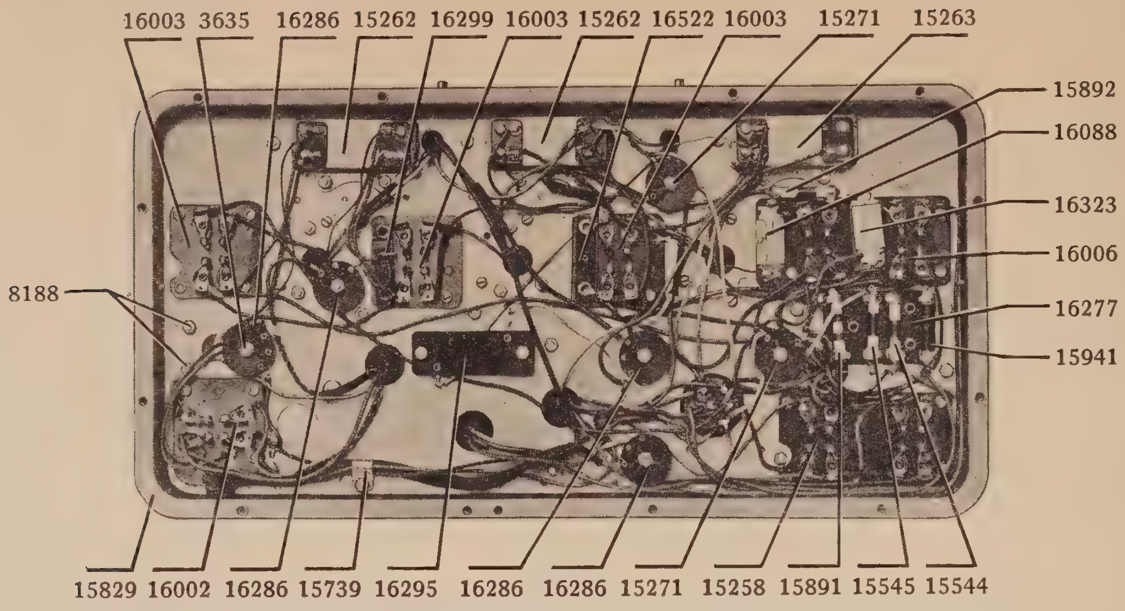
Note:—See Page 57.

15386 DISTANCE SWITCH ASSEMBLY

Note:—See Page 51.

Refer to numerical list for prices.

MODEL 61, No. 15300 SCREEN-GRID SET (D. C.) (Cont'd)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16002
16286
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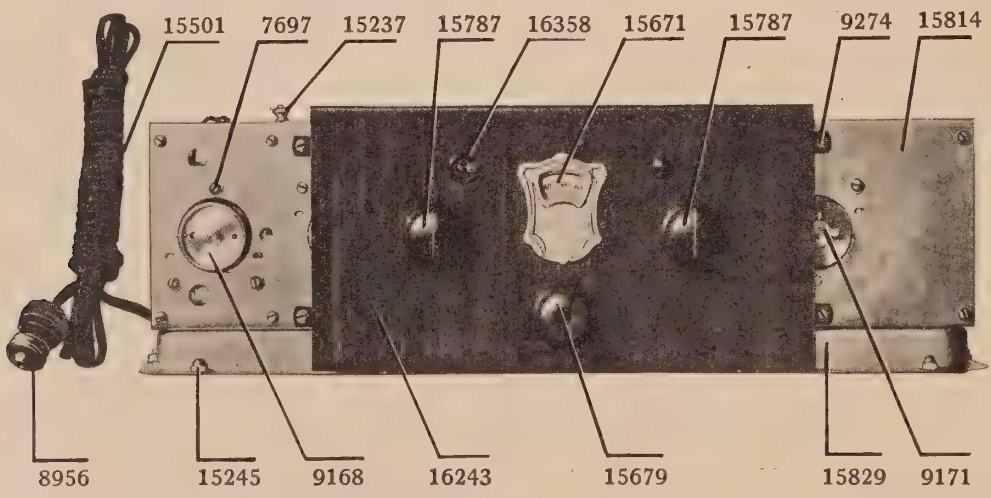
16286
15271
15258
15891
15545
15544

SUB-BASE ASSEMBLY

Part No.	
15829	Base Plate Only
16468	Base Plate, Sockets, Nameplates
15882	Speaker Plug Plate
15878	R. F. Tube Plate
15879	Det.-1st Audio Tube Plate
15881	2nd Audio Tube Plate
16002	Speaker Plug Socket
15258	2nd Audio Socket
16277	Four Resistance Base Assembly
15271	R. F. Choke (2 used)

Part No.	
16286	R. F. Choke (4 used)
16295	Bleeder Resis.
16522	3rd R. F. Fil. Shunt Resis.
16323	Double Phone Condenser
16088	Grid Condenser
16322	Bias Resis. Green Covered (2 used)
15891	Screen-grid Resis. No. 2 (red and black)
15941	Det. Plate Resis. (purple and yellow)
15892	Grid Leak (green)
16299	2nd R. F. Grid Bias Resis.

MODEL 61-C, No. 15400 SCREEN-GRID SET (D. C.)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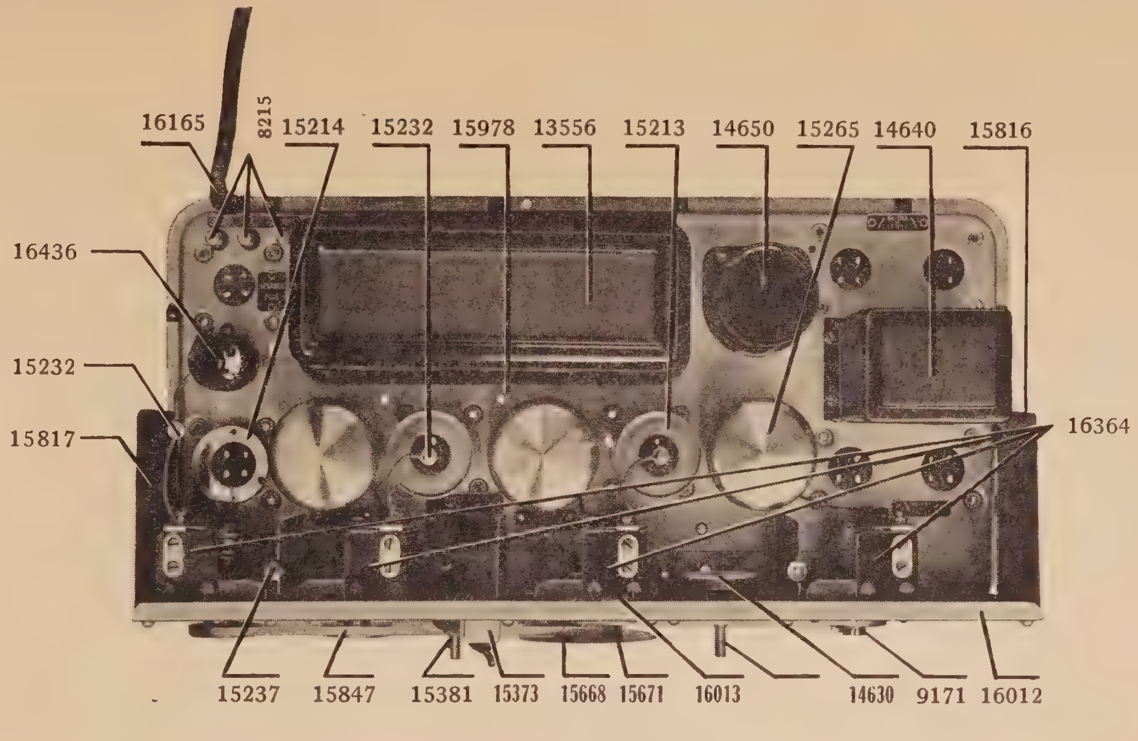
Note:—All parts not listed below are same as Model 61, No. 15300 Set, on Page 59, with the following exceptions.

Part No.	
16243	Front Panel Assembly
16238	Escutcheon
16072	Shipping Container

Refer to numerical list for prices.

MODEL 67, No. 15500 SCREEN-GRID SET (BATTERY)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16013
14630
9171
16012

Note:—All parts not listed below will be found under Model 55, No. 14900 Set, on Pages 51, 52, 53.

14660 CABINET ASSEMBLY, COMPLETE

Part No.	
15692	Body Assembly
13701	Lid
16237	Escutcheon

FINAL BASE ASSEMBLY

Part No.	
16436	R. F. Coil Group
15842	R. F. Coil Shield (1 used)
15265	R. F. Coil Shield (3 used)
15978	"C" Battery Container
13556	"C" Battery Container Lid
14640	No. 1 and No. 2 A. F. Trans. Assembly
14650	Output Trans. Unit
15876	Top Shield Support
16165	Battery Cable

MAIN PANEL ASSEMBLY

Part No.	
16012	Panel Only
15826	Angle Shield (1 used)
15237	Angle Shield (2 used)
15823	Top Shield
15876	Top Shield Support

15386 DISTANCE SWITCH ASSEMBLY

Note:—See Page 51.

VARIABLE CONDENSER ASSEMBLY

Part No.	
16364	Condenser Group
15845	Short Belt
15846	Long Belt
15847	Extra Long Belt

LAMP SOCKET ASSEMBLY

Part No.	
16013	Socket Assembly
16099	Lamp

16045 TOGGLE SWITCH ASSEMBLY

Part No.	
16283	Toggle Switch Only
15373	Bracket
16037	Insulation Sleeving

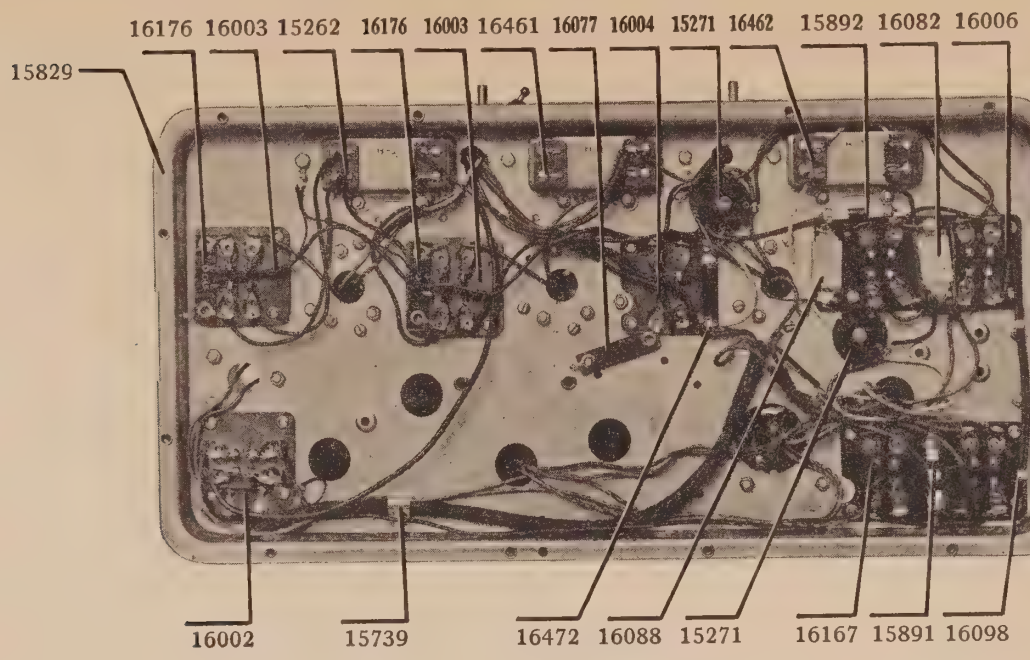
SET PARTS

Part No.	
16101	Literature Assembly
16058	Instruction Book
16032	Shipping Container

14630 VOL. CONT. UNIT, COMPLETE

Refer to numerical list for prices.

MODEL 67, No. 15500 SCREEN-GRID SET (BATTERY) (Cont'd.)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15271
16167
15891
16098

SUB-BASE ASSEMBLY

Part No.	
15829	Base Plate Only
16435	Base Plate, Sockets, Nameplates
15878	R. F. Tube Plate
15879	Det.-1st Audio Tube Plate
15881	2nd Audio Tube Plate
15877	Speaker Plug Plate
16002	Speaker Plug Socket
16003	R. F. Socket (2 used)
16004	R. F. Socket (1 used)
16167	2nd Audio Socket
16006	Det.-1st Audio Socket
15945	Model Nameplate
16176	1st and 2nd R. F. Fil. Resis. (2 used)

Part No.	
16077	3rd R. F. Fil. Resis.
16472	3rd R. F. Screen Resis. (purple and red)
15892	Grid Leak (green)
15891	Det. Plate Resis. (red and black)
16081	Det. A. F. Fil. Resis. (yellow tubing)
16082	Double Phone Condenser
16088	Grid Condenser
16098	Group Leads
15739	Wire Clamp
15262	R. F. By-pass Condenser
16461	Bypass Condenser
16462	Bypass Condenser

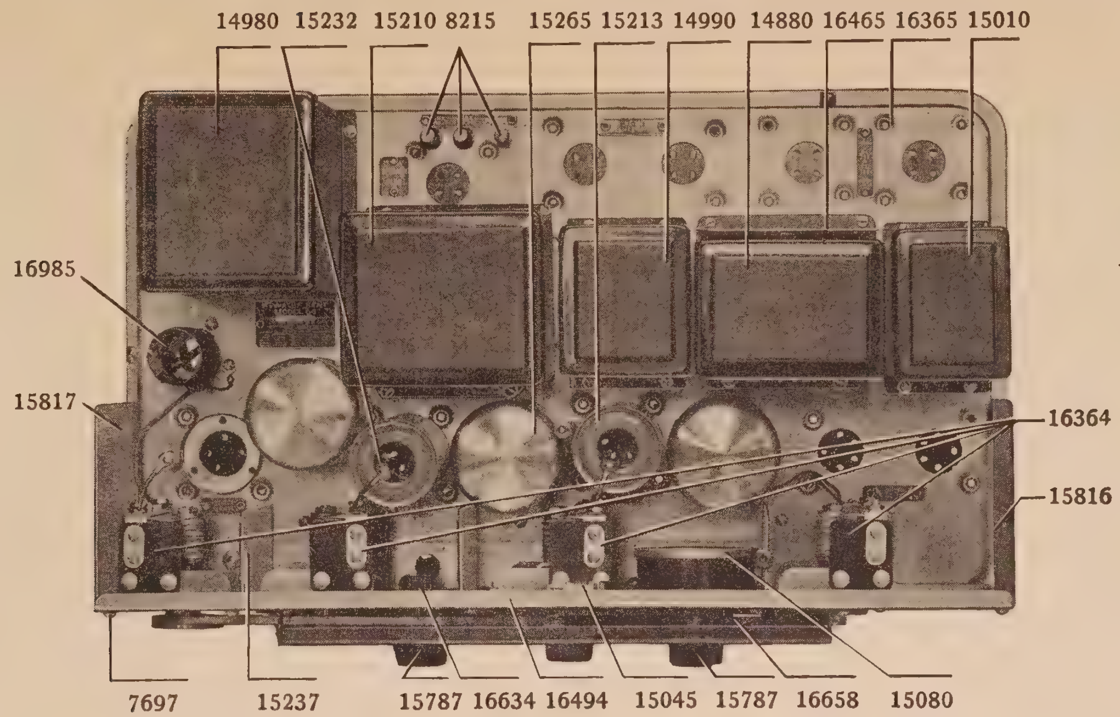
MODEL 67-C, No. 15200 SCREEN-GRID SET (BATTERY)

Note:—All parts for Model 67-C, No. 15200 Set are same as Model 67, No. 15500 Set, with the following exceptions.

Part No.	
16243	Front Panel Assembly
16033	Shipping Container

Refer to numerical list for prices.

MODEL 66, No. 15800 SCREEN-GRID SET (CONSOLE)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16634
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15045
15787
16658
15080

Note:—All parts not listed below will be found under Model 55, No. 14900 Set, on Pages 51, 52, 53.

FINAL BASE ASSEMBLY

Part No.	
16985	R. F. Coil Group....................
15265	R. F. Coil Shield (3 used)............
15842	R. F. Coil Shield (1 used)............
14980	Power Trans. Unit..................
15210	Filament Trans. Unit................
14990	Filter Choke Unit..................
14880	Condenser Unit....................
15010	Input and Output Unit..............
16396	Condenser Unit Cover...............
16465	Condenser Unit Shield...............

MAIN PANEL ASSEMBLY

Part No.	
16494	Main Panel Only....................
15237	Angle Shield (2 used)...............
15826	Angle Shield (1 used)...............
15816	R. H. End Shield....................
15817	L. H. End Shield....................
15823	Top Shield.........................

15080 VOLUME CONTROL UNIT........
Used in early sets.

Part No.	
16703	Housing and No. 1 Resistance........
16514	Shaft..............................
16642	Shaft Washer......................
16706	Contact and Pressure Arm Assembly..
16709	No. 2 Resistance...................

15170 VOLUME CONTROL UNIT........
Used in later sets.

Note:—See Page 57.

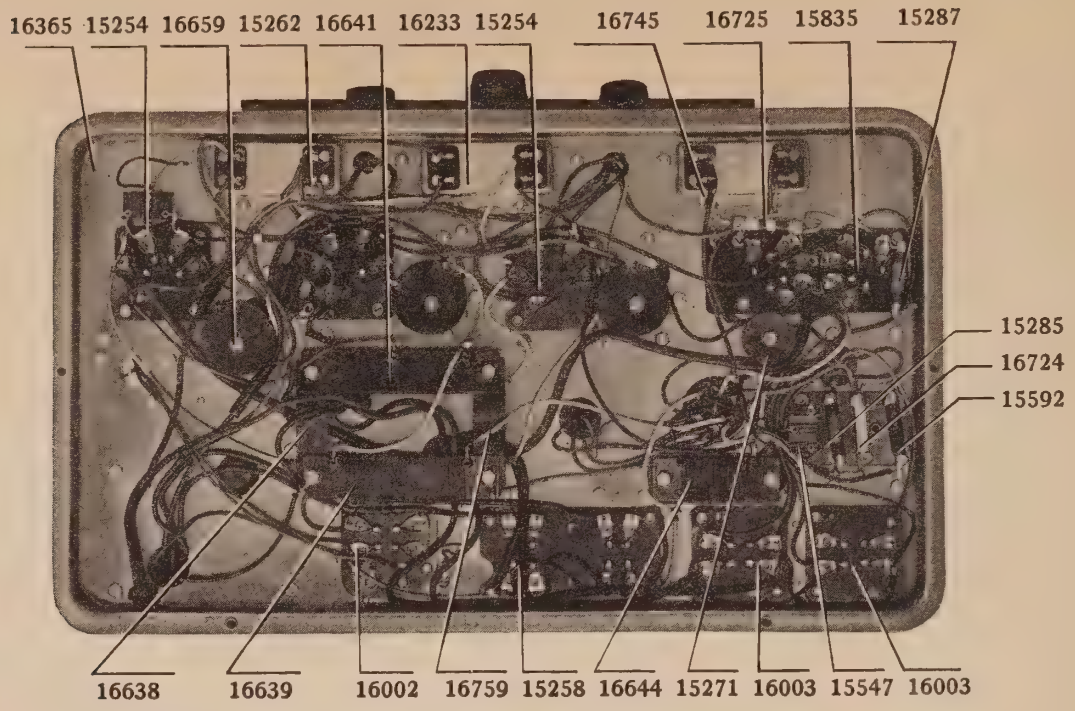
16634 TOGGLE SWITCH ASSEMBLY....

16658 FRONT PANEL ASSEMBLY, COMPLETE.....................

Part No.	
16632	Front Panel Only...................
16239	Escutcheon........................

Refer to numerical list for prices.

MODEL 66, No. 15800 SCREEN-GRID SET (CONSOLE) (Cont'd)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16759
15258
16644
15271
16003
15547
16003

SUB-BASE ASSEMBLY

Part No.	
16365	Base Plate Only
16986	Base Plate, Sockets, Nameplates
15254	R. F. Socket
15835	Det.-1st Audio Socket
16003	2nd Audio Socket
15258	Rectifier Socket
16002	Speaker Plug Socket
16724	Detector Filter Resis. (white)
16725	Detector Bias Resis. (black and yellow)
15287	1st A. F. Grid Leak (blue)
15592	Detector Coupling Resis. (black)
15262	No. 1 R. F. By-pass Condenser
16233	No. 2 R. F. By-pass Condenser
16745	Detector By-pass Condenser
15285	1st A. F. Filter Resis. (gray)
15547	2nd A. F. Fil. Shunt Resis.
15547	R. F. Det. 1st A. F. Fil. Shunt Resis.
16641	Bleeder Resis. No. 1
16759	Bleeder Resis. No. 2
16638	1st R. F. Bias Resis.
16639	R. F. Resis.
16768	R. F. Bias Resis.
16643	1st A. F. Bias Resis.
16644	2nd A. F. Grid Filter Resis.

16364 VARIABLE CONDENSER GROUP

Note:—See page 57.

15501 DOUBLE CONDUCTOR CORD AND PLUG

Note:—See page 53.

15405 LAMP SOCKET ASSEMBLY

Note:—See page 51.

SET PARTS

Part No.	
16687	Literature Assembly
16523	Instruction Book
16456	Shipping Container

Refer to numerical list for prices.

ATWATER KENT

RADIO

NUMERICAL PARTS PRICE LIST

FEBRUARY, 1931

The parts listed in this booklet are sold to Atwater Kent Radio Distributors only.

When ordering, be sure to give the number, name and finish of the part desired.

ATWATER KENT MANUFACTURING COMPANY
4700 WISSAHICKON AVENUE, PHILADELPHIA, PA.

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ATWATER KENT WARRANTY
FOR 1930-1931

We warrant each new Atwater Kent Radio Receiver and Radio Speaker to be free from defect in material and workmanship.

Our obligations under this warranty are limited to the following:
In the event that any part of this equipment proves defective and is returned, transportation charges prepaid, to the Atwater Kent Radio Distributor within ninety (90) days from the date of sale by the dealer to his customer, the defective part will be replaced and any necessary labor supplied without cost to the customer.

This warranty does not apply to any receiver or speaker which has been subject to misuse, neglect or accident, nor to any receiver or speaker which has not been connected in accordance with the instructions enclosed in the original container. Neither does it apply to any receiver or speaker, the serial number of which has been altered or removed. We do not assume any responsibility for tubes or other accessories not manufactured by us.

This warranty is in lieu of all other warranties expressed or implied; and we do not authorize any person or representative to assume for us any other liability in connection with our equipment.

Warranty material is repaired or replaced. Credit is not issued.

SALES DIVISION
SERVICE DEPARTMENT

Form No. 29A.

ATWATER KENT RADIO

Part No.	Name of Part	Price
113	Name Plate Pin	$ .50/C
179	Sub-panel Mounting Screw (D)	
202	Oscillator Cabinet	2.75
969	Screw	.30/C
1068	Staple	.10/C
1271	Lockwasher	.25/C
1547	Vernier Stud Screw (Superseded by 9337)	
1640	Relay Mounting Lockwasher (D)	
3419	Fibre Washer	.15/C
3469	Thumb Nut (Superseded by 15402)	
3470	Terminal Screw Washer (Superseded by 8217)	
3482	Mounting Nut (D)	
3486	Retaining Screw	.25/C
3487	Choke Coil Mounting Screw	.25/C
3504	Transformer Mounting Screw (Brass or Brown)	.30/C
3508	Holding Screw (D)	
3545	Panel Screw	.50/C
3597	Terminal Screw (Black, Brown, Tan, Nickel)	.30/C
3598	Contact Spring Screw	.25/C
3614	Binding Post Lock Nut	.05
3615	Acorn Nut (Brass)	.03
3616	Screw	.25/C
3620	Phone Post Screw	.30/C
3623	Dial Set Screw	.50/C
3627	Rheostat Switch Pointer (D)	
3635	Mounting Screw (Superseded by 13052)	
3638	Cover Retaining Screw (Superseded by 3616)	
3639	2nd-3rd A. F. Assembly (D)	
3646	Pri. Winding (Superseded by 9756)	
3703	Switch Contact Blade (D)	
3718	Screw	.02
3733	Detector-1st A. F. Assembly (D)	
3785	Condensite Knob	.35
3841	Mounting Nut (Superseded by 8188)	
3849	Rheostat Resistance Unit	.50
3853	Detector and 2 Stage Case and Transformers (Brown, Black, Gray)	8.00
3899	Rheostat Switch Pointer (D)	
3907	Wood Screw	.50/C
3911	Mounting Screw	.50/C
3933	Rubber Foot	.02
3978	Potentiometer	2.75
3987	Knob Holding Spring (D)	
4010	Transformer Mounting Screw (Superseded by 14788)	
4011	Potentiometer Resistance	1.00
4085	Binding Post Screw	.03
4098	Vernier Knob (Brass)	.22
4147	Rotor Tension Spring	.15
4150	Spacer Screw Nut	.01
4151	Shaft Adjusting Screw (D)	
4164	Tension Spring Adjusting Screw	.02

Part No.	Name of Part	Price
4166	Tension Spring Adjusting Screw Lock Nut (Superseded by 8957)	
4177	End Cover Retaining Screw (Superseded by 3616)	
4179	Shaft Adjusting Screw Lock Nut (D)	
4183	Battery Switch	$ .65
4210	Horn Type Speaker Bell	4.00
4211	Base Pad (D)	
4214	Base Screw	.30/C
4215	Base Nut	.02
4221	Screw	.03
4239	Cable Clip	.50/C
4251	Diaphragm	.20
4252	Diaphragm Gasket	.05
4254	Diaphragm Adjusting Spring	.15
4259	Phone Cord (9 feet)	.80
4261	Base Assembly	10.25
4266	Horn Type Speaker Goose Neck	10.00
4277	Panel Nut (Superseded by 8188)	
4301	Diaphragm Washer	.15
4315	Shipping Container, Model M (D)	
4334	Antenna Name Plate (D)	
4335	Ground Name Plate (D)	
4338	Reproducer Housing (5-V)	1.50
4339	Reproducer Housing (6-C)	1.50
4366	Mounting Nut (Superseded by 8957)	
4410	Mounting Nut	.01
4426	Switch Contact Spring	.04
4435	Switch Contact Spring Washer	.20/C
4437	Phonograph Attachment, Type 5-V (D)	
4438	Phonograph Attachment, Type 6-C (D)	
4439	Reproducer Housing (Model M)	1.50
4450	Sound Unit Nut (D)	
4452	Reproducer Housing Set Screw (D)	
4459	Stator Plate (D)	
4460	Radio Speaker (Model M) (D)	
4465	Grid Condenser	.45
4477	Condensite Cover (D)	
4496	Binding Post Screw (Superseded by 13052)	
4497	Rheostat Resistance	.50
4499	Potentiometer	2.75
4500	Tube Unit	4.50
4516	Thumb Screw	.07
4520	Detector and 2 Stage Amplifier Unit	16.50
4527	Cable Terminal (Superseded by 8352)	
4529	Cable Eyelet (D)	
4557	Rotor Locknut (D)	
4561	Nut	.03
4562	Rotor Plate (D)	
4565	Variable Condenser Complete	10.00
4566	Stator Spacer Screw Nut (D)	
4572	Variable Condenser Case (D)	
4577	Rotor Assembly (D)	
4588	Rotor Balance Weight (D)	

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ATWATER KENT RADIO

Part No.	Name of Part	Price
4591	Rotor Shaft Spring (D)	
4594	Envelope (D)	
4596	Log Card ....net..$	.75/C
4606	Screw (Superseded by 7697)	
4623	Vernier Knob Screw.............	.25/C
4628	Sound Unit, complete (7-L)......	6.25
4631	Trans. End Cover and Angle Plate (D)	
4632	Reproducer Housing (Model L) ..	1.10
4633	No. 1 Tapped R. F. Transformer..	3.75
4636	No. 2 or No. 3 R. F. Transformer..	3.50
4640	Receiving Set (Model 20) (D)....	
4642	Gooseneck	3.25
4645	Radio Speaker (Model L) (D) ...	
4646	Magnet Housing Assembly	4.50
4648	Bell	2.50
4649	Bell Holding Screw	.30/C
4651	Mounting Board (D)	
4654	Front Condenser Plate (D)	
4655	Variable Condenser With Dial ...	6.30
4660	Receiving Set (Model 9) (D).....	
4661	Tube Unit	4.50
4662	Rheostat Resistance Unit	.50
4663	No. 2 R. F. Transformer	3.50
4664	Battery Cable (12 feet)	3.50
4665	Rotor Connector	.06
4666	Solder Clip	.50/C
4680	Cabinet (D)	
4685	Ground and Antenna Name Plate.	.15
4686	Speaker and Battery Conn. Nameplate (D)	
4688	Panel Bracket (D)	
4690	Rheostat Resistance Unit for R. F.	.15
4691	Knob Holding Spring	.07
4693	Ground and Antenna Post	.12
4694	Binding Post Thumb Screw	.07
4700	Receiving Set (Model 10) (D) ...	
4702	Panel and Angle Piece	3.00
4704	Lid Hinge (D)	
4708	Log Card Clip (D)	
4709	Lead Pencil Clip (D)	
4710	Wood Screw (Nickel)	.50/C
4711	Panel Stub (Nickel and Gold)....	.08
4713	Dial Indicator	.10
4714	No. 1 Tapped Transformer	2.00
4715	No. 1 Var. Cond. and Trans. Assembly (D)	
4717	No. 1 R. F. Tube Socket	1.25
4719	Tap Switch Assembly	1.50
4725	No. 2 Var. Cond. and Trans. Assembly (D)	
4732	No. 2 R. F. Tube Socket (Superseded by 7630)	
4733	No. 2 or No. 3 R. F. Transformer..	2.00
4738	No. 3 Var. Cond. and Trans. Assembly (D)	
4743	Double Rheostat	3.75
4748	A. F. Transformer (Superseded by 4779)	
4767	Phone Cord	.65
4768	Lid Hinge Screw (D)	
4769	Detector-1st-A. F. Assembly (D)..	
4772	2nd-3rd-A. F. Assembly (D)......	
4779	A. F. Transformer...............$	4.00
4780	Det. and 2 Stage Amp. Assembly (D)	
4781	Grid Leak Clip (D)	
4782	Grid Leak (Superseded by 15892)	
4785	Solder Clip	.50/C
4794	Transformer Mounting Spacer (D)	
4795	Ground Post Screw	.30/C
4796	Transformer Mounting Screw (D)	
4800	Radio Speaker (Model R) (D) ...	
4801	Mounting Board (D)	
4802	Tube Socket	1.25
4803	Hinge Screw (D)	
4805	Rear Condenser Plate	.75
4806	Reproducer Housing (D)	
4814	Grid Leak (Superseded by 15892)	
4815	Rivet (Superseded by 8015)	
4818	Spacer Sleeve (D)	
4819	Spacer Screw (D)	
4820	Spacer Screw (D)	
4822	Lockwasher	.10/C
4827	Shipping Container (D)	
4832	Panel and Angle Piece	2.75
4833	Pencil	.06
4834	Screw (D)	
4835	Shipping Container (D)	
4836	Plate Holding Screw (Superseded by 14916)	
4837	Dial	.80
4838	Diaphragm	.20
4849	Diaphragm Washer	.10
4850	Diaphragm Adjusting Spring	.12
4851	Nameplate	.50
4860	Cabinet (D)	
4864	Gooseneck	2.00
4866	Diaphragm Gasket	.05
4872	Knob and Contact Spring........	.65
4873	Knob Assembly	.65
4874	Base and Taps	.90
4877	Socket Mounting Wood Screw....	.50/C
4879	No. 2 Grid Resistance	.40
4880	Receiving Set (Model 19) (D)	
4887	Reproducer Housing Screw.......	.30/C
4888	Shipping Container (Model L) net	.25
4889	Phone Cord (6 feet)	.60
4892	Shipping Container (Model R) (D)	
4896	Magnet Housing Assembly	3.65
4897	Base Assembly Complete (D) ...	
4900	Var. Condenser, Complete with Dial	10.00
4903	Battery Cable (6 feet)	2.00
4905	Battery Cable (10 feet)	3.00
4907	Panel Mounting Screw (Superseded by 13052)	
4909	Panel Screw (Gold)	.15
4910	Receiving Set (Model 12) (D) ...	
4914	Tap Switch Assembly	2.25
4917	Mounting Board (D)	
4920	Receiving Set (Model 24) (D)....	

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ATWATER KENT RADIO

Part No.	Name of Part	Price
4921	Switch Knob Complete (D)	
4924	Lid Support Hinge (D)	
4925	Two-Stage Amplifier Unit	$14.00
4927	Phone Binding Post (D)	
4933	Base Pad (D)	
4934	Base Pad	.18
4936	Washer (Superseded by 8217)	
4940	Detector and 1 Stage Amp. Unit (D)	
4944	Shipping Container (Model 12) (D)	
4946	No. 2 R. F. Transformer	3.50
4949	Grid Resistance	.40
4953	Rheostat Resistance	.50
4960	Fixed Resistance (D)	
4977	Grid Resistance	.40
4986	Cabinet (Model 19) (D)	
4988	Shipping Container (D)	
5522	Washer	.02
5523	Bushing	.02
5558	Screw (D)	
7566	Literature Assembly (D)	
7570	Receiving Set (Model 20 Compact) (D)	
7573	Diaphragm Washer	.10
7580	Base Assembly	7.00
7590	Battery Cable Holding Clamp	.07
7600	Cabinet (D)	
7616	Nameplate	.50
7617	Panel and Angle Piece	2.00
7618	No. 1 Trans. and Var. Cond. Assembly (D)	
7619	No. 1 R. F. Tube Socket	1.25
7620	No. 2 Variable Condenser and Transformer Assembly (D)	
7621	No. 3 Var. Cond. and Trans. Assembly (D)	
7622	Detector and Two Stage Amplifier (D)	
7623	Shipping Container, Model 20-7570 (Superseded by 8291)	
7626	Radio Speaker Name Plate (D)	
7630	No. 2 or 3 R. F. Tube Socket	1.00
7631	Hinge Screw (D)	
7632	Hinge (D)	
7637	Terminal Card Eyelet	.40/C
7638	Phone Post Spring	.07
7639	Grid Leak (Superseded by 15892)	
7640	Double Rheostat	3.75
7644	Tube Contact Spring	.07
7647	Binding Post (Superseded by 8215)	
7650	Tap Switch Assembly	2.25
7653	Battery Cable	3.00
7660	A. F. Transformer (Superseded by 7661)	
7661	A. F. Transformer	4.00
7682	Tube Socket Mounting Screw	.30/C
7683	Rubber Foot	.02
7684	White Gummed Tape per ft.	.01
7686	Black Sleeving per ft.	.08
7689	Cable Clamp Strap	.05
7693	Reproducer Housing	1.10

Part No.	Name of Part	Price
7696	Panel Corner Stud	$ .15
7697	Mounting Screw	.30/C
7700	Radio Speaker (Model H) (D)	
7701	Gooseneck	5.25
7710	No. 1 Tapped Transformer	2.00
7712	No. 3 R. F. Transformer	2.00
7717	Magnet Housing Assembly	4.00
7718	Base Assembly Complete	7.25
7719	Bell	2.50
7720	Shipping Container (Model H) net	.35
7727	Base Nut (D)	
7741	Diaphragm Pin	.05
7745	Reed	.05
7750	Radio Speaker (Model K) (D)	
7754	Base Pad (D)	
7755	Base Washer	.08
7758	Phone Cord (6 feet)	.60
7759	Base Screw (Superseded by 14916)	
7779	Shipping Container (Model K) (D)	
7780	Receiving Set (Model 21) (D)	
7781	Frame with Name Plate	6.00
7782	Sound Unit Complete (D)	
7790	Battery Container (D)	
7805	Binding Spring Lead Wire (D)	
7807	Cabinet (D)	
7808	No. 1 R. F. Tube Socket (D)	
7809	No. 3 R. F. Transformer	2.00
7810	No. 2 R. F. Trans. and Var. Cond. Assembly (D)	
7811	No. 2 R. F. Tube Socket (D)	
7812	No. 3 Var. Cond. and Trans. Assembly (D)	
7813	Detector and 2 Stage Amplifier (D)	
7815	Battery Cable (Superseded by 7653)	
7816	Shipping Container (Model 21) (Superseded by 8291)	
7830	Grid Condenser (Superseded by 4465)	
7838	No. 2 R. F. Transformer	2.00
7839	No. 2 R. F. Transformer (D)	
7840	Double Rheostat	3.75
7844	Tap Switch Knob Assembly	.85
7845	Tap Switch Base and Taps (D)	
7852	Instruc. Book (Vol. 3 only) net	.50
7853	Detector and 2 Stage Amp. Base	3.50
7854	Detector and 2 Stage Amp. Base	3.80
7855	Detector and 2 Stage Amp. Base (D)	
7873	Diaphragm	1.25
7874	Base Only	4.00
7876	Base Only	1.00
7877	Base Only (D)	
7878	Horn Speaker Bell (D)	
7879	Base Only	.75
7881	Sound Unit (D)	
7882	Sound Unit (D)	
7883	Sound Unit (D)	
7893	By-pass Condenser (Superseded by 14902)	
7898	Mounting Screw	.01

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ATWATER KENT RADIO

Part No.	Name of Part	Price
7958	No. 2 Condenser Mtg. Stud (D)	
7960	Receiving Set (Model 20 Compact) (D)	
7961	Vernier Knob Screw	$ .10
7965	Condenser Pulley Belt	.15
7973	Vernier Knob Stud (11/16 in. long)	.07
7975	Log Card (Superseded by 9091)	
7977	Set Screw	.50/C
8000	Receiving Set (Model 30) (D)	
8002	Binding Spring Lead Wire (D)	
8014	Name Plate (D)	
8015	Name Plate Rivet	.10/C
8020	Tube Socket	1.25
8021	Tube Socket	1.00
8022	Detector and 2 Stage Amp. (D)	
8023	Panel and Angle Piece	2.00
8030	Detector and 2 Stage Amp. (D)	
8035	Cabinet (D)	
8042	Shipping Container (Model 30 and 48) (Superseded by 8291)	
8050	Wiring Assembly (D)	
8060	No. 1 A. F. Transformer (Round, Oval, Dented)	5.00
8062	Choke Coil (Superseded by 8232)	
8073	Bearing Tension Spring	.05
8085	Extension Washer (Superseded by 8217)	
8086	Var. Cond. Stop Spring	.05
8090	Rheostat	2.50
8092	Grid Resistance	.40
8094	Bearing Tension Spring	.05
8100	Receiving Set (Model 35) (D)	
8106	Screw	.30/C
8108	R. F. Amplifier	8.00
8110	Cabinet Complete	7.50
8112	Grid Condenser	.40
8119	Wiring Assembly (D)	
8120	Shipping Container (Model 35) (Superseded by 8291)	
8123	Binding Spring and Lead (D)	
8126	A. F. Fixed Resistance	.26
8131	Phone Post Screw (Superseded by 9337)	
8136	Condenser Pulley Belt (Superseded by 13483)	
8145	R. F. Oscillator Transformer	2.00
8146	Condenser Pulley Belt (Superseded by 13484)	
8167	Vernier Knob—less Screw	.46
8169	Radio Speaker Name Plate (D)	
8185	Sub-panel Assembly	35.00
8187	Mounting Screw	.30/C
8188	Mounting Nut	.01
8190	Detector Grid Bias Resistor	.50
8194	Grid Leak Clip	.05
8195	Grid Leak (Superseded by 15892)	
8208	Antenna and Ground Name Plate	.11
8209	Screw	.04
8215	Binding Post	.20
8217	Washer	.01
8218	Mounting Nut	.01
8220	Mounting Lock Washer	$ .10/C
8221	Mounting Screw	.30/C
8225	Grid Resistance Unit	.40
8232	Choke Coil	.70
8233	Lid Corner Stud	.25
8235	Base Retaining Nut	.05
8236	Name Plate (Ship)	1.25
8237	Grid Leak Clip (Superseded by 8194)	
8238	Detector 2 Stage Base	2.00
8241	Phone Condenser	.50
8245	Log Card (D)	
8246	Base Pad	.04
8247	Bottom Base Pad (D)	
8249	Rivet	.50/C
8250	Cabinet (D)	
8251	Tube Socket	1.25
8252	No. 1 R. F. Transformer	2.00
8253	No. 2 R. F. Transformer	2.00
8254	No. 3 R. F. Transformer	2.00
8255	Double Rheostat	3.75
8256	A. F. Fixed Resistance	.26
8257	Double Rheostat	3.75
8262	No. 1 Var. Cond. and Trans. Assembly (D)	
8263	No. 2 Var. Cond. and Trans. Assembly (D)	
8264	No. 3 Var. Cond. and Trans. Assembly (D)	
8269	Shipping Container (Model 20-7960) (Superseded by 8291)	
8270	Receiving Set (Model 32) (D)	
8272	Name Plate Rivet	.02
8275	Detector and 2 Stage Amp. (D)	
8281	Panel and Angle Piece	2.75
8282	Condenser Pulley Belt	.15
8284	Grid Resistance Unit	.40
8287	Base and Pads	1.25
8290	Radio Speaker (Model G) (D)	
8291	Shipping Container (Model 32) net	.40
8296	Sub-panel Assembly	53.00
8302	Double Rheostat	3.75
8303	A. F. Fixed Resistance	.25
8308	Rheostat Resistance for R. F.	.15
8310	Rheostat Resistance for Det	.15
8316	Shipping Container (Model G) (D)	
8327	Battery Cable Tag for 7653 Cable	.02
8330	Detector and 2 Stage Amp. (D)	
8340	Detector and 2 Stage Amp. (D)	
8352	Battery Cable Terminal Clip	.06
8362	Base Only (Model G)	1.00
8363	Reproducer Housing	1.10
8364	Base Assembly	7.25
8365	Gooseneck	5.25
8366	Bell	2.50
8401	Solder Clip	.50/C
8415	Double Rheostat	3.75
8417	Variable Condenser for Oscillator	4.00
8420	Cabinet	6.00
8422	Front Panel	2.00
8439	Grid Resistance	.40

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Part No.	Name of Part	Price
8440	R. F. Amplifier	$ 8.00
8449	R. F. Amplifier	8.00
8464	Binding Spring and Lead (D)	
8466	Binding Spring and Lead (D)	
8477	Reproducer Housing (V-E)	2.50
8499	Volume Control Lead (D)	
8500	Receiving Set (Model 50) (D)	
8503	Antenna Adj. Condenser Plate	.10
8507	Antenna Adj. Condenser Washer	.03
8509	Antenna Adj. Condenser Shaft	.20
8513	Antenna Adj. Condenser, complete	.35
8519	R. F. Trans. Cap	.25
8523	R. F. Coil Mounting Screw	.05
8525	A. F. Mtg. Bracket (D)	
8530	Cabinet (D)	
8535	No. 1 R. F. Amplifier	9.50
8540	No. 2 R. F. Amplifier	22.00
8553	Metal Container (D)	
8555	Double Rheostat	3.75
8559	Front Panel (D)	
8571	Metal Container Screw	.25/C
8574	Name Plate (Model E and E-2)	.50
8582	Cabinet Lid (D)	
8585	Stabilizing Condenser	.50
8586	Magnet Housing Assembly	4.00
8587	Magnet Housing Assembly	4.90
8590	Phone Condenser	.60
8591	No. 2 Tuning Coil Fixed Condenser	.50
8593	Grid Condenser	.40
8595	Phono. Attachment (Type VE-O) (D)	
8599	Rheostat Resistance for R. F.	.15
8601	No. 3 Tuning Coil Fixed Condenser	.50
8602	Shipping Container (Model 50) (D)	
8627	A. F. Fixed Resistance	.26
8640	A. F. Base and Springs	3.00
8650	No. 1 A. F. Transformer	5.00
8660	Choke Coil	.70
8670	Radio Speaker (Model E) (D)	
8685	By-pass Condenser (Superseded by 14902)	
8690	By-pass Condenser (Superseded by 14902)	
8700	Phono. Attach. (Type VE-E) (D)	
8714	Wood Screw	.03
8729	Screw (Superseded by 14916)	
8730	Gold Phone Cord (9 feet)	1.25
8731	Base Washer	.01
8732	Frame Assembly	5.50
8749	Rubber Damper	.01
8750	Rectifying Tube (D)	
8752	Sound Unit Mounting Nut	.12
8753	Solder Clip	.50/C
8754	Diaphragm Mounting Screw	.10
8759	Sound Unit	7.00
8766	Cloth Screen	.25
8767	Screen Retaining Ring	.03
8768	Mounting Washer	.01
8769	Base Washer (D)	
8776	Diaphragm Spring Nut	.04
8778	Shipping Container (E Speaker) net	.40
8779	Diaphragm	$ 3.25
8796	No. 1 R. F. Resistance	.50
8800	"B" Power Unit (Type R-60 cycles) (D)	
8852	Terminal Screw Nut (Superseded by 8957)	
8861	Case Lid	1.00
8862	Base	1.00
8870	2 Stage Amplifier (D)	
8872	Transformer Assembly	7.50
8875	Condenser Assembly	16.00
8887	Relay Spring (D)	
8888	Relay Assembly	4.25
8890	Choke Assembly	6.25
8900	Radio Speaker (Model E Console) (D)	
8908	Relay Mounting Screw	.25/C
8909	Bushing	.04
8910	Mounting Screw (Superseded by 9688)	
8911	Short strap	.20
8912	Fibre Sheet	.10
8915	Resistance Coil (5 and 7 taps)	1.60
8919	Detector Resistance (Interchangeable with 15287 and 16282)	.25
8920	Panel Assembly (Old Style 3 taps)	1.25
8921	Trickle Charger Receptacle	.75
8925	Long Bolt	.05
8926	Short Bolt	.05
8927	Bushing (D)	
8929	Panel with Terminal Leads (D)	
8930	Receiving Set (Model 33) (D)	
8931	Terminal Nut	.03
8932	Thumb Nut	.05
8940	No. 2 A. F. Transformer	4.50
8945	Aluminum Shield (D)	
8946	Shipping Container net	.25
8950	Double Rheostat	3.75
8956	110-Volt Plug	.30
8957	Relay and Vol. Control Mtg. Nut	.30/C
8958	Terminal Clip (Superseded by 9741)	
8960	Double Conductor Cord and Plug	1.00
8961	Relay and Base Assembly	5.40
8963	Condenser Pulley Belt (Superseded by 13675)	
8964	Condenser Pulley Belt (Superseded by 13676)	
8966	Frame (Console)	6.50
8969	Phone Cord (5 feet) (Superseded by 4889)	
8971	Ground Spring (D)	
8976	Base Screw (Superseded by 14916)	
8988	Front Panel	2.50
8993	Cabinet	7.00
8996	Grid Resistance	.40
8997	Shipping Container (Model 33 and 49) (Superseded by 8291)	
9000	"B" Power Unit (Type S-25 cycles) (D)	
9008	Tube Socket	1.50

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Part No.	Name of Part	Price
9009	Wiring Assembly (D)	
9010	Battery Cable	$ 3.00
9020	R. F. Amplifier	8.00
9021	Mounting Screw	.25/C
9022	Antenna Adj. Knob	.30
9030	R. F. Amplifier	8.00
9040	Receiving Set (Model 30-C) (D)	
9043	Battery Cable (5 feet)	1.60
9050	Receiving Set (Model 33-C) (D)	
9056	Front Panel (Model 30-C)	2.00
9059	Front Panel (Model 33-C)	2.50
9065	Cabinet Lid (D)	
9074	Panel Only (5 taps)	1.25
9075	Battery Lead	.15
9088	Base Pad and Screw	.10
9091	Log Card	net .75/C
9100	Variable Condenser Group	12.00
9117	Fixed Contact and Holder (D)	
9120	Instruction Book (Vol. 4)	net .50
9123	Tube Cap	.35
9128	Name Plate Rivet (Black and Nickel)	.30/C
9150	Case Lid	1.00
9156	Transformer Assembly	10.50
9158	Mounting Bushing	.05
9162	Short Bolt Bushing (D)	
9163	Short Bolt (D)	
9168	Variable Condenser Pulley	.55
9169	Var. Cond. Pulley	.65
9171	Variable Condenser Pulley	.60
9174	Base Only	2.00
9179	No. 1 R. F. Transformer	5.00
9181	No. 2 R. F. Transformer	5.50
9182	No. 3 R. F. Transformer	5.50
9183	No. 4 R. F. Transformer	5.50
9184	R. F. Tuning Coil Assembly	20.00
9190	Variable Condenser Group	16.00
9201	Variable Condenser Group	12.00
9205	Front Retaining Screw	.02
9206	Name Plate Eyelet	.20/C
9209	Screw	.35/C
9210	Variable Condenser Group	12.00
9220	R. F. Coil Group	16.00
9223	Grilled Front with Name Plate	4.25
9224	Case with Trickle Charger Name Plate	2.00
9226	Case with Trickle Charger Name Plate (D)	
9245	No. 2 R. F. Base (D)	
9246	No. 1 R. F. Base (D)	
9255	Diaphragm Screw and Nut Wrench	.10
9262	Mounting Lock Washer	.30/C
9273	Base Gasket	.03
9274	Mounting Screw	.30/C
9337	Binding Post Screw (Cadium)	.25/C
9366	Mounting Nut	.02
9390	Receiving Set (Model 36) (D)	
9397	Rubber Insulating Bushing	.03
9400	Receiving Set (Model 38) (D)	
9424	A. F. Resistance (Superseded by 15941 or 16472)	
9431	Panel Assembly	$ 4.25
9432	Panel Screw	.65/C
9434	Filament Shunt Resistance	.50
9447	Resistance Mtg. Screw (Nickel Cadium)	.30/C
9469	Case Only	2.25
9480	Cabinet (Model 36)	13.00
9486	Potentiometer Assembly	2.00
9488	Long Strap Assembly	1.00
9490	Volume Control	4.75
9495	Front Panel (D)	
9497	Double By-pass Condenser (Superseded by 15158)	
9499	Case Lid	1.00
9500	Receiving Set (Model 37-60 cycles) (D)	
9503	Transformer Assembly	12.00
9505	Condenser Assembly	17.00
9510	Volume Control	3.75
9511	Auxiliary Choke and Condenser	9.50
9515	Resistance Coil	2.25
9521	Double Conductor Cord and Plug (Superseded by 8960)	
9554	Receptacle	.85
9560	Cabinet and Lid (Model 38)	16.00
9561	Volume Control (Condenser Type) (D)	
9563	Condenser Unit (D)	
9575	Single By-pass Condenser (Superceded by 14902)	
9584	Cable (less panel) (D)	
9585	Socket Plug	1.00
9586	Cable Clamp	.15
9587	Cable Clamp Strap	.05
9588	Power Supply Cable and Panel	5.25
9590	Radio Frequency Coil Group	16.00
9591	Cable Connection Panel	1.00
9597	Shunt Resistance	.50
9598	Phone Condenser	.50
9601	Detector and 2 Stage Amp. Base	2.00
9602	Detector and 2 Stage Amp. (D)	
9612	Wiring Assembly (D)	
9614	Binding Spring and Lead (D)	
9619	Toggle Switch (D)	
9620	Cabinet and Lid (Model 37)	11.00
9633	Cond. Unit Holding Spring (D)	
9650	Panel and Holders	1.25
9653	Shipping Container (Model 36) (Superseded by 8291)	
9655	Literature Assembly (D)	
9660	Radio Frequency Amplifier	8.00
9675	Solder Clip	.50/C
9678	Solder Clip	.50/C
9681	Case Only	2.25
9684	Long Strap Only	.60
9685	Bushing	.15
9687	Mounting Screw	.30/C
9688	Ground Screw	.35/C
9689	Screw	.30/C
9691	Resistance—226	.50
9692	Resistance—171	.55

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Part No.	Name of Part	Price
9693	Panel Assembly, less strap	$ 5.25
9694	Panel and Strap Assembly (D)	
9696	Case Lid, with Tube Name Plate	1.00
9697	Mounting Screw	.30/C
9700	Receiving Set (Model 37-C) (D)	
9701	Transformer Assembly	14.00
9704	Condenser Assembly	17.00
9705	Choke Assembly	8.00
9710	Cabinet and Lid (Model 37)	11.00
9740	Model 37-25 cycle set (D)	
9741	Soldering Clip	.50/C
9746	Volume Control Housing	1.25
9747	Cable Connection Panel	.75
9748	Power Supply Cable and Panel	4.75
9756	Primary Winding	1.50
9760	Model E (Modernistic) Speaker (D)	
9764	Strap Only (Superseded by 13196)	
9770	Model 37 (Modernistic) set (D)	
9771	Volume Control Knob	.45
9774	Volume Control Housing	1.50
9775	Volume Control Contact Arm	.50
9781	No. 1 Resistance	1.00
9782	No. 2 Resistance	1.10
9785	Contact Arm, with Set Screw (Superseded by 14857)	
9786	Knob Holding Spring	.05
9788	Volume Control Resistance (Superseded by 13604)	
9790	Model E-2 Radio Speaker (D)	
9797	Volume Control Knob	.40
9798	Lead (red) (D)	
9800	Model 40 Receiving Set (D)	
9801	Volume Control Lead (red) (D)	
9802	Volume Control Lead (green) (D)	
9804	Cable Connection Panel	.75
9807	Mounting Screw	.25/C
9810	Model E-3 Radio Speaker (D)	
9818	Power Unit Base	1.50
9825	Choke and Condenser Assembly	13.50
9826	Mounting Bolt	.05
9829	Double Conductor Cord and Plug	1.25
9830	Model 37-C—25 cycle Set (D)	
9831	Panel and Strap Assembly (D)	
9840	Model 48 Receiving Set (D)	
9850	Model 42 Receiving Set (D)	
9860	Model 49 Receiving Set (D)	
9870	Model 43 Receiving Set (D)	
9880	Model 45 Receiving Set (D)	
9890	Model F Radio Speaker (D)	
9898	Mounting Lock Washer	.25/C
9900	Model 44 Receiving Set (D)	
9905	Dial	1.00
9906	Dial Indicator	.10
9909	Power Unit Base	1.50
9910	Model 41 Receiving Set (d. c.) (D)	
9911	Shipping Container (Model 37) (Superseded by 15326)	
9919	Power Unit Cover	2.50
9920	Cabinet Body (Model 37)	6.75
9925	Cabinet Body (Model 38)	9.50
9928	Double By-pass Condenser (Superseded by 15158)	
9929	Front Panel	$ 2.50
9930	Model 52 Receiving Set (D)	
9944	Wiring Assembly (D)	
9952	Cabinet Lid (Model 37)	4.50
9960	Model 40—25 cycle Set (D)	
9970	Model 42—25 cycle Set (D)	
9973	Power Supply Cable and Panel	1.75
9975	Tube Chart	.06
9980	Model 44—25 cycle Set (D)	
9991	Toggle Switch	1.00
11013	Base Nut	.03
13004	Power Supply Panel Assembly	5.50
13005	Power Supply Panel Assembly	5.50
13018	Volume Control Unit	4.25
13020	Volume Control Unit (13018 and 13020 are Interchangeable)	4.25
13029	Tube Chart	.06
13030	Radio Frequency Amp. Assembly	8.00
13047	Detector Resistance (Superseded by 15592)	
13052	Screw	.30/C
13063	Shipping Container (37 P. S.) (D)	
13076	Locking Clip	.02
13079	Panel Mounting Screw	.35/C
13081	"On" Button (Black or Gold)	.10
13082	Shipping Container (Model 37 Console) (Superseded by 15326)	
13085	Front Panel (37-C Set)	2.50
13090	Cabinet and Lid (37—25 cycle Set)	11.00
13093	Solder Clip	.50/C
13094	Panel and Strap Assembly (D)	
13100	Model 53 Receiving Set (D)	
13105	Double By-pass Condenser (Superseded by 15158)	
13112	Contact Spring Set Screw	.05
13113	Antenna and Ground Cable Assembly Complete	1.10
13117	Panel and Strap Assembly (D)	
13118	Cable Clip	.05
13119	Ant. and Ground Cable Only (D)	
13121	Panel and Strap Assembly (D)	
13125	Extension Washer (D)	
13127	Power Supply Panel Assembly	5.50
13128	Bias Resistance	.50
13129	Volume Control Lead (red) (D)	
13133	Transformer Assembly	16.50
13134	Literature Assembly (D)	
13136	Cabinet Body (Model 37)	6.75
13138	Bias Resistance	.50
13139	Volume Control Lead (red) (D)	
13141	Shipping Container (Model 38) (Superseded by 15326)	
13145	Fibre Washer	.25/C
13155	Literature Assembly (D)	
13156	Wiring Assembly (D)	
13158	Tube Chart	.06
13160	Radio Frequency Amplifier	8.00
13161	Power Unit Base	1.50
13163	"25-Cycle" Name Plate (D)	

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Part No.	Name of Part	Price
13165	Cabinet Lid (38 Set)	$ 6.50
13170	Variable Condenser Group	12.00
13173	Transformer Assembly	16.50
13180	Power Supply Cable and Panel	1.75
13181	Ant. and Ground Base and Bracket	.20
13190	Radio Frequency Amplifier	8.00
13196	Strap and Wire Holders	1.25
13200	Variable Condenser Group	16.00
13210	Variable Condenser Group	16.00
13214	Power Supply Cable and Panel	2.00
13218	Wood Mounting Screw (blued)	.50/C
13219	Wood Mounting Screw (blued)	.50/C
13220	Radio Frequency Coil Group	16.00
13222	Cable Bracket	.03
13226	Cabinet Body (37—25 cycle Set)	6.75
13231	Tube Chart	.06
13232	Literature Assembly (D)	
13234	25 Cycle Transformer	17.50
13235	25 Cycle Choke and Condenser	17.50
13247	Knob Holding Spring	.07
13249	Screw	.35/C
13263	Condenser Pulley	.55
13264	Extra Long Pulley Belt (Superseded by 13677)	
13276	No. 1 Audio Frequency Transformer (Superseded by 8060)	
13277	Double Conductor Cord and Plug (Superseded by 9829)	
13282	Detector and 2 Stage Amplifier (D)	
13289	Bias Resistance	.55
13296	Radio Frequency Plate Resistance (Superseded by 16253)	
13297	Volume Control Lead (red) (D)	
13298	Volume Control Lead (green) (D)	
13301	Sound Unit Bag	.65
13302	Toggle Switch and Leads	1.25
13303	Bias Resistance	.50
13304	Power Supply Panel Assembly	5.50
13305	Panel and Strap Assembly (D)	
13306	Sheet Fibre Insulator (1½ x 3)	.25/C
13310	Power Unit Cover and Chart	2.60
13314	Power Unit Cover and Chart (25 Cycles)	2.85
13315	Condenser and Choke Assembly	13.50
13320	Volume Control Unit (13320, 13390 and 14060 are Interchangeable)	4.25
13323	227 Fil. Resistance ("Y" P. S.)	.25
13324	Fil. Series Resistance ("Y" P. S.)	.25
13330	Cabinet and Lid (Model 40)	9.50
13341	Panel and Strap Assembly (D)	
13342	Cable Connection Panel	.75
13344	Panel and Strap Assembly (D)	
13345	Power Supply Cable and Panel	1.75
13346	Power Supply Panel Assembly	5.50
13349	Transformer Assembly	16.50
13353	Tan Bronze Lacquer (pint can) net	.75
13354	Gold Lacquer (pint can) .....net	.75
13355	Brown Lacquer (pint can) ....net	.75
13356	Black Lacquer (pint can).....net	.75
13357	Aluminum White (pint can)...net	.75
13358	Bakelite Brown (pint can) ....net	.75
13360	Geromino Gray (pint can)...net..	$ .75
13363	Detector and 2 Stage Amplifier (D)	
13369	Resistance	.50
13370	Cabinet and Lid (Model 42)	11.00
13383	Radio Frequency Plate Resistance (Superseded by 16253)	
13384	Panel Assembly for Power Supply	5.50
13385	Shipping Container (37—25 Cycle P. S.) (D)	
13390	Volume Control Unit (13320, 13390 and 14060 are Interchangeable)	4.25
13395	Soldering Clip	.50/C
13407	White Lead (D)	
13410	Cabinet and Lid (Model 44)	12.00
13436	Volume Control Lead (green) (D)	
13437	Volume Control Lead (red) (D)	
13438	Volume Control Lead (red) (D)	
13440	Wiring Assembly (D)	
13442	Resistance Unit Shield (D)	
13468	Brown Gummed Tape (D)	
13482	Antenna Coupling Transformer (Superseded by 13668)	
13483	Condenser Belt	.15
13484	Condenser Belt	.15
13487	Tube Chart	.06
13489	Shipping Container (Model 40) (Superseded by 15326)	
13492	Literature Assembly (40-42-44) (D)	
13496	Wiring Assembly (D)	
13498	Black Dial	1.00
13499	Cable Bracket	.05
13500	Model E-3 Flange Speaker (D)	
13501	Volume Control Housing	1.25
13502	Volume Control Knob (Brown and Black)	.40
13503	Antenna and Ground Base	.25
13504	Antenna and Ground Cable and Post Assembly	1.25
13506	Cable Connection Panel	.75
13507	Power Supply Cable and Panel	2.00
13509	Cable Sleeve	.15
13515	Cabinet Body (Model 40)	6.00
13516	Dial Indicator	.10
13517	Cabinet Feet	.05
13519	Lid Name Plate (D)	
13521	Cabinet Lid (Model 40)	4.00
13530	Volume Control Unit	5.25
13534	Panel and Resistance Holders	1.00
13535	Power Supply Panel Assembly	5.50
13538	Bias Resistance	.60
13550	Volume Control (Model 41)	3.75
13555	Trans. Condenser and Choke (Models 40, 56, 57)	20.50
13556	Power Supply Cover	.75
13568	Vernier Knob, Less Screw	.45
13569	Ant. and Ground Post Screw	.25/C
13580	Cabinet and Lid (Model 41)	9.50
13587	Shipping Cont. (E-2 Speaker).net	.35
13590	Cabinet and Lid (Model 40-F)	10.00
13600	Model 52 Speaker Assembly (D)	
13603	Screen Retaining Ring	.05

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Part No.	Name of Part	Price
13604	Volume Control Resistance	$ 1.25
13605	Volume Control Lead (D)	
13606	Volume Control Lead (D)	
13607	Volume Control Lead (D)	
13608	Shipping Container (Model 42) (Superseded by 15326)	
13609	Shipping Container (Model 44) (Superseded by 15326)	
13610	Contact Spring Washer	.02
13621	Literature Assembly (Model 42) (D)	
13623	Vernier Knob, Less Screw	.45
13624	Dial	1.00
13627	Cabinet Body	7.00
13628	Vernier Knob Screw	.08
13631	Ball Foot	.05
13632	Felt Foot and Screw	.05
13634	Name Plate	.75
13635	Cabinet Lid	4.50
13643	Trans., Condenser and Choke (Models 42 and 52)	21.75
13645	Automatic Voltage Control	1.25
13650	Model E-3 Speaker, with Lugs (D)	
13660	Cabinet and Lid (Model 42-F)	11.00
13661	Service Manual and Binder....net	.50
13664	Toggle Switch	1.00
13668	Antenna Coupling Transformer	1.00
13670	Cabinet and Lid (Model 44-F)	12.00
13675	Condenser Belt	.15
13676	Condenser Belt	.15
13677	Condenser Belt	.20
13678	3-Pole Toggle Switch	1.25
13680	R. F. Amplifier Assembly	8.00
13682	Literature Assembly (D)	
13688	Wiring Assembly (D)	
13691	Volume Control Lead (D)	
13692	Volume Control Lead (D)	
13693	Volume Control Lead (D)	
13698	Cabinet Body (Model 44)	7.50
13701	Cabinet Lid	3.00
13702	Tube Chart	.06
13728	Mounting Strap	.06
13730	Cabinet Body (Model 43)	11.00
13735	Round-Head Base Nut	.10
13742	Cable Sleeve (D)	
13743	Power Supply Cable and Panel	2.00
13748	Vernier Stud	.08
13754	Transformer, Cond. and Choke	22.75
13755	Voltage Regulator	1.25
13756	Bias Resistance	.50
13758	Panel Assembly (Superseded by 14954)	
13761	Model E-2 Frame	3.75
13763	Model E-2 Base	2.00
13764	Cloth Screen	.10
13769	Diaphragm	2.75
13772	Front Grill, With Name Plate	4.00
13779	Base Gasket	.70/C
13780	Volume Control Unit	4.75
13782	Sound Unit (Superseded by 8759)	
13784	Frame	3.75

Part No.	Name of Part	Price
13786	Base	$ 2.00
13788	Sound Unit (Superseded by 8759)	
13789	Cloth Screen	.10
13791	Screen Retaining Ring	.05
13796	Diaphragm	2.75
13798	Front Grill, Complete	4.00
13803	Shipping Cont. (E-3 Speaker).net	.35
13807	Base Gasket	.70/C
13809	Mounting Screw	.30/C
13810	Cabinet and Lid (Model 45)	9.50
13811	Mounting Screw	.30/C
13813	Power Supply Cover (Superseded by 14753)	
13822	Name Plate (D)	
13826	Grill Screen (D)	
13833	Top Pole Piece	3.75
13836	Back Plate	.50
13839	Mounting Screw	.03
13843	Speaker Housing	2.60
13848	Speaker Housing (E-3 Flange)	4.00
13852	Steel Ring	.40
13880	Cabinet and Lid (Model 46)	11.00
13882	Antenna Name Plate (D)	
13885	Frame	4.25
13886	Frame (E-3 Lugs)	4.50
13897	Ground Clamp Screw (2 in. long)	.05
13898	Shipping Container (Model 52) (D)	
13899	Ground Clamp Only (D)	
13900	Receiving Set (Model 56) (D)	
13901	No. 1 R. F. Plate Resistance	.50
13905	D. C. Name Plate	.10
13908	R. F. Coil Group	16.00
13913	Cabinet Lid	2.25
13914	Cabinet Body	9.75
13915	Straight Leg	1.35
13916	Straight Leg Gasket	.70/C
13917	Curved Leg	1.35
13918	Ornament	.85
13919	Curved Leg Gasket	.80/C
13926	Literature Assembly (D)	
13928	Washer	.01
13929	Large Washer (Cork)	.01
13931	Small Washer (Cork)	.01
13932	Mounting Washer	.01
13934	Rear Grill Ring	.10
13935	Front Grill Ring	.20
13936	Cardboard Washer	.01
13937	Wire Clamp	.08
13938	Front or Rear Grill	1.40
13943	Antenna Cable (D)	
13944	Ground Cable (D)	
13946	Terminal (D)	
13955	Double By-pass Condenser (Superseded by 15157)	
13956	Single By-pass Condenser	1.50
13959	Resistance Base	.20
13961	Filament Series Resistance	.40
13964	Detector and 2 Stage Base	2.00
13966	Panel Assembly	4.00
13967	Panel Assembly	5.00
13968	Sound Unit (Superseded by 14229)	

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Part No.	Name of Part	Price
13970	Cabinet Body	$ 6.00
13971	Diaphragm	2.75
13982	Sound Unit Nut	.15
13985	Sound Unit	7.00
13988	Shipping Container (E-3) ....net	.30
13989	Ground Clamp Assembly	.30
13991	Cabinet Body (Model 40-F)	6.50
13996	Cabinet Body (Model 42-F)	7.00
13997	Cabinet Body (Model 44-F)	7.50
14000	Receiving Set (Model 57) (D)	
14003	Model 40, 42, 44 Instruction Book ....net	.10
14004	Model 52 Instruction Book ....net	.10
14005	Model 41 Instruction Book ....net	.10
14006	Model 40, 42, 44 (25 Cycle) Instruction Book ....net	.10
14007	Shipping Container (Model 41) (Superseded by 15326)	
14008	Literature Assembly (D)	
14013	No. 2 A. F. Transformer (Model 43)	6.00
14015	No. 2 A. F. Transformer (Model 41)	5.50
14016	No. 1 A. F. Transformer (Model 43)	6.00
14020	Cabinet and Lid (Model 47)	12.00
14022	Tube Chart (Model 41)	.06
14024	Lead (red) (D)	
14025	Lead (black) (D)	
14026	Antenna and Ground Assembly	1.25
14039	Filament Shunt Resistance	1.25
14041	Automatic Voltage Control	1.25
14042	No. 1 R. F. Choke	1.00
14053	Wiring Assembling (D)	
14060	Volume Control Unit (Interchangeable with 13320 and 13390)	4.25
14071	Detector and 2 Stage Amp. (D)	
14072	Phone Condenser	.50
14074	Variable Condenser Group (Superseded by 13200)	
14084	Cable Connection Panel	.75
14085	Power Cable and Panel	1.75
14100	Receiving Set (Model 46) (D)	
14114	Trans., Cond. and Choke (41 Set)	25.50
14131	Clamp Support	.10
14132	Clamp	.10
14138	Panel and Resistance Holders	.65
14141	Antenna and Ground Assembly	2.40
14165	Clamp	.08
14166	Clamp Support	.08
14169	Speaker Cord	.60
14173	Eyelet	.50/C
14187	Literature Assembly (Models 40-F, 42-F, 44-F) (D)	
14188	Shipping Container (Model 42-F) (Superseded by 15326)	
14193	Shipping Container (Model 44-F) (Superseded by 15326)	
14194	Shipping Container (Model 40-F) (Superseded by 15326)	
14200	Model F-2 Speaker (D)	

Part No.	Name of Part	Price
14203	Model 52 Case (D)	
14211	Cable Only (D)	
14225	Dust Proof Bag (D)	
14229	Sound Unit	$ 7.00
14247	Choke and Condenser Assembly	9.50
14249	Trans., Cond. and Choke Assembly	22.75
14250	Volume Control Unit	1.10
14256	Choke and Cond. Assembly (Models 40-F, 42-F, 44-F)	9.75
14258	Trans., Cond. and Choke (Model 42-F)	31.50
14262	Mounting Strap Assembly	.20
14292	Trans., Cond. and Choke (Model 44-F)	32.75
14295	Trans., Cond. and Choke (Model 40-F)	30.50
14299	Shipping Container (Model 43) (Superseded by 15326)	
14300	Model F-2-C Power Speaker (D)	
14302	Instruction Book (Model 43)..net	.10
14304	Shipping Container (Model 45) (Superseded by 15326)	
14308	Detector and 2 Stage Base	2.00
14314	Detector and 2 Stage Amp. (D)	
14315	Power Cable and Panel	1.75
14320	Filter Choke	4.20
14330	Input and Output Transformer Unit	6.40
14340	Condenser Unit	11.10
14350	Cabinet and Lid (Model 55 Full Vision)	6.50
14358	Back Screen	.10
14359	Back Screen Ring	.05
14360	Power Transformer Unit (Superseded by 14470)	
14361	Case and Coil Assembly	13.00
14365	Stud Spacer	.15
14367	Mounting Nut	.02
14368	Cone Housing	2.75
14369	Sound Unit (D)	
14371	Speaker Base	2.75
14374	Diaphragm Assembly	6.75
14378	Speaker Plug Card (D)	
14379	Spider Screw (Nickel and Brown)	.35/C
14381	Spider Washer	.01
14382	Steel Ring (3 Segments)	1.00
14383	Fibre Ring	.10
14384	Fibre Ring	.15
14386	Front Ring	.20
14388	Front Screen and Ring	1.60
14389	Wire Grill	1.55
14391	Front Cover	1.75
14392	Stud Spacer Nut	.25
14393	Mtg. Nut (Superseded by 8188)	
14394	Screw	.30/C
14396	Washer (fibre)	.01
14397	Bushing (fibre)	.35/C
14407	Output Transformer (Test-stand)	5.25
14412	Speaker Plug Socket	1.25
14414	Trans., Cond. and Choke (Model 43)	26.50

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Part No.	Name of Part	Price
14421	Panel Assembly (Superseded by 14587)	
14427	Bias Resistance	$ .60
14432	Green and Yellow Lead (D)	
14460	Cabinet Assembly	6.50
14470	Power Transformer Unit.........	10.90
14471	R. F. Choke	1.00
14474	Shipping Container (E-3 Flange and Lug) ....net	.30
14475	Tube Chart (Model 43)	.06
14476	Speaker Plug Card	.02
14477	Wooden Top Brace (D)	
14478	Wooden Bottom Brace (D)	
14492	Shipping Cont. (F Speaker) net..	.60
14494	Black and Green Lead (D)	
14495	Red and Green Lead (D)	
14497	Screw	.30/C
14500	Receiving Set (Model 47) (D) ...	
14507	Green Lead (D)	
14508	Diaphragm E-3 Flange	2.75
14512	Mounting Bracket (D)	
14516	By-pass Condenser (Superseded by 15158)	
14521	Cabinet Body	19.75
14527	Mounting Bracket (D)	
14528	Speaker Mounting Strap	.35
14532	Mounting Nut	.60/C
14534	Speaker Housing	4.25
14537	Cable and Plug Assembly.........	2.75
14549	Name Plate (D)	
14560	Power Transformer Unit	11.30
14562	Retaining Washer	.02
14565	Detector Resistance (Superseded by 15592)	
14569	Insulating Sleeve (Black) (D) ...	
14571	Cone Housing (D)	
14575	Resistance (Superseded by 15941 or 16472)	
14586	Panel Only	.75
14587	Panel Assembly, Complete	5.00
14615	Mounting Screw	.25/C
14620	Cabinet and Lid (Model 60)......	6.50
14622	Diaphragm Centering Gauge (per set of 3)	.10
14630	Volume Control Unit	3.00
14636	Binding Post Base	.08
14639	Cabinet Body	15.00
14640	Audio Unit	7.60
14641	Console Body and Lid	27.00
14642	Antenna Cable (D)	
14644	Red Lead (D)	
14646	Ant. and Ground Assembly (D) .	
14647	Antenna and Ground Assembly ...	1.30
14650	Output Transformer Unit	2.50
14652	Shipping Container (Model 57) (D)	
14653	Instruction Book ....net	.10
14654	Instruction Book (Model 56)..net	.10
14655	Literature Assembly (D)	
14658	Literature Assembly (D)	
14659	Shipping Container (Model 56) (D)	
14660	Cabinet and Lid (Model 67)......	6.50
14665	Body Assembly (Model 56).....	$19.75
14666	Leg	.60
14667	Console Body and Lid (Model 56).	24.00
14674	Cabinet Body (Model 45)........	7.50
14675	Taupe Lacquer (per pint).....net	.75
14679	Transformer, Condenser and Choke Assembly (Model 45)	22.25
14687	Set Screw	.50/C
14691	Model 46 Nameplate (D).........	
14694	Rectifying Tube Socket (Superseded by 8021)................	
14709	Literature Assembly (D)........	
14710	Condenser Unit..................	9.70
14712	Tube Chart (Model 46)	.06
14715	Cabinet Body (Model 46)........	6.75
14720	Condenser Unit..................	12.00
14721	No. 1 A. F. Transformer.........	5.50
14722	No. 2 A. F. Transformer..........	5.75
14723	Detector and 2 Stage Amplifier (D)	
14730	Cabinet and Lid (Model 55-F)....	6.50
14736	Paper Insulating Tube...........	.10/C
14738	Speaker Plug Chart..............	.03
14740	Power Transformer Unit.........	12.00
14743	Condenser Assembly	8.75
14746	Transformer, Condenser Choke Assembly (Superseded by 15155).	
14750	Power Transformer Unit.........	12.30
14753	Power Supply Cover (Models 40-F, 42-F, 44-F)	.75
14766	Shipping Container (Model 46) (Superseded by 15326)	
14767	Instruction Book (Model 46)..net	.10
14768	Shipping Cont. (Superseded by 15578)	
14769	Shipping Container (F-2-C Speaker) (Superseded by 15578).........	
14788	Screw	.20/C
14853	Gasket (D).....................	
14857	Contact Arm Complete...........	.50
14861	Grid Condenser..................	.40
14880	Condenser Unit..................	17.10
14883	Instruction Book (Model 45)..net	.10
14889	Mounting Bracket	.50
14890	Volume Control Unit (Replaced by 14250)	
14893	Instruction Book (Model 53)...net	.10
14895	Lockwasher (D).................	
14902	By-pass Condenser..............	1.25
14904	Lavender Lacquer (per pint)..net	.75
14905	Tube Chart......................	.06
14906	Tube Chart......................	.06
14910	Input and Output Transformer Unit (Superseded by 14330)	
14911	Literature Assembly (D).........	
14912	Shipping Container (Model 53) (D)	
14915	Console Body and Lid (Model 53).	24.00
14916	Screw	.25/C
14920	Power Choke Unit...............	8.60
14921	Cable Only (D).................	
14922	Cable and Plug Assembly.........	1.65
14926	Condenser Assembly (Superseded by 14743)	

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Part No.	Name of Part	Price
14928	Transformer, Condenser Choke Assembly (Superseded by 15155)	
14930	Filament Resistance Assembly	$ 1.80
14938	Nameplate (D)	
14940	Audio Unit	8.30
14942	Nut (Superseded by 8188)	
14943	Transformer and Choke Assembly (Model 44)	18.30
14944	Transformer and Choke Assembly (Model 45)	17.20
14945	Transformer and Choke Assembly (Models 46, 53)	17.90
14946	Transformer and Choke Assembly (Model 40-F)	20.30
14947	Transformer and Choke Assembly (Model 42-F)	20.70
14948	Transformer and Choke Assembly (Model 44-F)	20.70
14949	Transformer and Choke Assembly (Superseded by 14945)	
14950	Cabinet and Lid (Model 61)	6.50
14951	Transformer and Choke Assembly (Model 47)	18.40
14952	Washer	.25
14954	Panel Assembly, Complete	3.90
14975	Cabinet Body	7.50
14977	Tube Chart	.06
14980	Power Transformer Unit	14.40
14984	Transformer, Condenser, Choke Assembly (Superseded by 15162)	
14990	Filter Choke Unit	6.00
14992	Antenna and Ground Assembly, Complete (Superseded by 13504)	
14995	No. 1 A. F. Transformer (Superseded by 14721)	
14996	No. 2 A. F. Transformer (Superseded by 14722)	
14997	Detector and 2 Stage Amplifier (D)	
14999	Double By-pass Condenser (Superseded by 15158)	
15006	Nut	.02
15008	Literature Assembly (D)	
15009	Instruction Book (Models 46, 47) net	.10
15010	Input and Output Transformer Unit (Superseded by 14330)	
15011	Shipping Container, Model 47 (Superseded by 15326)	
15039	Screw (Superseded by 9807)	
15041	Mounting Screw	.30/C
15042	Terminal Card (D)	
15043	Connection Card (D)	
15044	Green Lacquer (per pint) net	.75
15045	Red Lacquer (per pint) net	.75
15063	Bias Resistance	.60
15064	Panel Assembly	3.40
15079	Speaker Plug	.65
15080	Volume Control Unit (Superseded by 15160)	
15081	Mounting Screw (Superseded by 9274)	
15085	Solder Clip	$ .50/C
15092	Large Washer	.15
15102	Nameplate (F-4 Speaker)	.08
15113	Cable Connection Card	.10
15114	Top Pole Piece	3.00
15115	Contact Arm Adjusting Gauge	.10
15118	Back Plate	.50
15128	Mounting Screw	.06
15129	Mounting Lock Washer	.30/C
15131	Mounting Bolt	.03
15133	Mounting Washer	.04
15134	Washer (Leather)	.01
15135	Cone Housing Assembly	1.70
15137	Field Coil Spacer	.09
15138	Case and Coil Assembly	13.00
15139	Top Pole Piece	1.50
15142	Diaphragm Assembly	4.00
15152	Front Screen and Ring	1.25
15155	Trans., Cond. and Choke Assembly	27.40
15157	Double By-pass Condenser	1.70
15158	Double By-pass Condenser	1.70
15160	Volume Control Unit	3.00
15162	Transf., Cond. and Choke Assembly	28.00
15170	Volume Control Unit (Superseded by 15160)	
15193	Case and Coil Mounting Bolt	.06
15203	Terminal Card	.20
15209	Volume Control Shaft	.10
15210	Filament Transformer Unit	10.30
15211	Volume Control Housing	1.10
15213	Tube Shield	.15
15214	Tube Shield Base	.03
15226	Cable and Plug Assembly	1.65
15227	Cable and Plug Assembly	1.65
15228	Main Panel Only	.80
15232	Grid Cap and Lead	.10
15237	Angle Shield	.25
15241	Condenser Belt	.15
15242	Condenser Belt	.15
15244	Base Plate Only (D)	
15245	Round Head Base Nut	.05
15246	Base Plate Only (D)	
15252	Rectifying and Speaker Plug Socket	.70
15254	R. F. Tube Socket	.30
15256	Tube Socket	.65
15258	Tube Socket	.50
15261	Resistor Base (Superseded by 17093)	
15262	R. F. By-pass Condenser	1.00
15263	Detector By-pass Condenser	.90
15265	R. F. Coil Shield	.50
15271	R. F. Choke	.25
15272	Resistor (Superseded by 15660)	
15274	Resistor (Superseded by One-16988 and One-17077)	
15278	Output Group Leads (D)	
15279	Spacer Screw	.70/C
15281	Solder Clip	.02
15283	Binding Post Screw	.30/C
15285	Resistor (gray)	.50
15286A	Resistor (purple) (Superseded by 16330)	

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Part No.	Name of Part	Price
15286B	Resistor (purple) (Superseded by 16295)	
15287	Resistor (blue) (Interchangeable with 8919 and 16282)	$ .25
15297	Volume Control Resistance	.45
15302	Distance Switch Knob (black and brown)	.25
15325	Cabinet Body (Model 55 Full Vision)	2.80
15326	Shipping Container net	.65
15327	Condenser Unit Cover	.40
15328	Condenser Unit Spring	.10
15329	Transformer Unit Lid	.20
15331	Choke Unit Lid	.20
15332	Condenser Unit Lid	.20
15333	Input and Output Unit Lid	.15
15337	Spacer Bushing	.03
15369	Top Shield	.50
15373	Toggle Switch Bracket	.03
15374	Distance Switch Contact Blade (Superseded by 18112)	
15380	Front Panel only	1.50
15381	Distance Switch Shaft	.08
15383	Distance Switch Base	.20
15386	Distance Switch Assembly	.50
15390	Detector Cap and Ground Clamp Assembly	.60
15393	R. F. Amplifier Shipping Cont. net	.10
15401	Lamp Socket Bracket	.70/C
15402	Thumb Nut	.05
15404	Dial-Light (2.5 volts)	.25
15405	Dial-Light Socket Assembly	.30
15407	Bezel (D)	
15408	R. F. Tube Nameplate	.10
15409	Tube Nameplate	.08
15410	Literature Assembly (D)	
15411	Tube Nameplate	.08
15412	Tube Nameplate	.10
15413	Base Assembly Screw	.30/C
15414	Felt Foot	.08
15415	Bottom Plate	1.30
15443	Toggle Switch Assembly (Superseded by 16996)	
15446	Blue Lead (D)	
15447	Red Lead (D)	
15450	Filter Choke Assembly	5.75
15479	Filament Group Leads (D)	
15480	Filter Condenser (5 taps)	7.95
15491	Resistance Group Leads (D)	
15499	Double Conductor Cord Only (D)	
15501	Double Conductor Cord and Plug (Superseded by 9829)	
15506	Condenser Unit Spacer (Wood)	.10
15520	Input A. F. Trans	3.75
15530	Output A. F. Trans	3.25
15540	Stopping or Compensating Condenser	.10
15541	Jewel Only (D)	
15542	Bezel Nut (D)	
15543	Jewel Assembly (D)	
15544	Resistor (yellow)	.25
15545	Resistor (maroon)	.25

Part No.	Name of Part	Price
15547	Resistance Unit (Superseded by 17077)	
15550	On-off Switch, Complete	$ 1.10
15559	Field Coil Spacer	.06
15561	Case and Coil Assembly Mounting Washer	.10/C
15562	Switch Knob Set Screw	.30/C
15564	White Lead (D)	
15565	Red Lead (D)	
15566	Red Lead (black tracer) (D)	
15572	Back Stud	.06
15574	Speaker Hanger	.25
15578	Shipping Container net	.35
15579	Shipping Container (F-4) net	.45
15586	Two Resistance Base (Less Resistors)	.25
15587	Antenna and Ground Nameplate	.10
15588	Instruction Book (Models 55 and 60) net	.10
15591	Literature Assembly (Models 55 and 60) (D)	
15592	Resistor (black)	.25
15595	Case and Coil Assembly	13.00
15604	Instruction Sheet (F-4-C) net	.02
15611	Cone Housing Assembly	2.60
15612	Case and Coil Assembly	13.00
15620	Local-Distance Switch	.90
15627	Case and Coil Mounting Washer	.30/C
15629	Field Coil Only (F)	9.80
15631	Field Coil Only	9.80
15635	Field Coil Only	9.80
15638	R. F. Coil Group	3.40
15638A	Coil Group (Superseded by 16990)	
15639	Sub-base Assembly (D)	
15640	Detector By-pass	1.00
15642	Black Lead with Solder Clip (D)	
15643	Mounting Lockwasher	.30/C
15648	Mounting Screw	.20/C
15650	Power Trans. Assembly	7.50
15656	Bottom Cover	1.30
15660	Resistor	.20
15668	Dial Gear	.20
15670	Resistance (Superseded by 15660)	
15671	Dial Vision Plate	.20
15672	Escutcheon (Model 55)	.45
15673	Rosette	.04
15675	Front Panel Only	.70
15676	Front Panel Assembly	1.50
15678	Dial Knob Only	.25
15679	Dial Knob Assembly (black or brown)	.30
15681	Dial Rubber	.02
15682	Dial Knob Screw (black-brown)	.06
15686	Dial Condenser Pulley	.70
15688	Shipping Container (Model 55-C) net	.65
15689	Shipping Container (Superseded by 15326)	
15692	Cabinet Body (Models 55, 60, 61, 67)	3.50
15705	Power Transformer Unit Brace	.08
15708	Back Plate	.50

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Part No.	Name of Part	Price
15720	R. F. Bias Resistance (Superseded by 15830)	
15739	Wire Clamp	$ .02
15742	Yellow Lead (D)	
15747	Dial-Light Resistor	.20
15765	Power Transformer Brace Washer	.30/C
15766	Power Transformer Brace Screw	.45/C
15770	R. F. By-pass	1.00
15776	Dial Adjustment Support	.06
15780	R. F. By-pass	1.10
15787	Vol. Cont. or Dist. Switch Knob	.25
15790	R. F. By-pass	1.00
15792	Double Phone Condenser	.60
15794	Model Nameplate	.10
15802	Resistor (red) (Superseded by 16472 or 15941)	
15803	Tube Nameplate	.10
15804	Tube Nameplate	.10
15805	Shipping Container (F-6) net	.45
15806	Shipping Container (F-6-C) (Superseded by 15578)	
15807	Shipping Container (F-7) net	.45
15808	Shipping Container (F-7-C) (Superseded by 15578)	
15810	Resistance (Superseded by 16320)	
15814	Main Panel Only	1.00
15815	Base Plate Only	2.40
15816	R. H. End Shield	.20
15817	L. H. End Shield	.20
15820	Resistance (Superseded by 16320)	
15823	Top Shield	1.10
15826	Angle Shield	.15
15829	Base Plate Only (D)	
15830	Resistance	.15
15832	Rec. and Speaker Plug Socket	.75
15833	Condenser Unit Spring	.07
15834	Condenser Unit Spacer	.50/C
15835	Tube Socket	.70
15837	R. F. By-pass (Superseded by 16233)	
15842	R. F. Coil Shield	.55
15845	Condenser Belt	.15
15846	Condenser Belt	.15
15847	Condenser Belt	.15
15850	Filter-Condenser (6 taps)	7.95
15852	Shipping Container (Model 60) (Superseded by 15326)	
15854	Field Coil Only	9.80
15855	Case and Coil Assembly	13.00
15863	Field Coil Only	9.80
15864	Case and Coil Assembly	13.00
15869	Case and Coil Assembly	13.00
15870	Tone-Control Condenser	1.00
15872	Case and Coil Assembly	13.00
15874	Cone Housing Assembly	2.80
15875	Cone Housing Assembly	2.90
15876	Top Shield Support	.15
15877	Tube Nameplate	.10
15878	Tube Nameplate	.10
15879	Tube Nameplate	.10
15880	Power Transformer	12.00
15881	Tube Nameplate	$ .10
15882	Tube Nameplate	.15
15887	Nameplate	.20
15889	Nameplate	.15
15891	Resistor (red and black)	.25
15892	Grid Leak (green)	.25
15904	Resistance (Superseded by 16988)	
15910	Literature Assembly (Type D) net	.20
15911	Insulation Sleeving (per foot)	.12
15916	Tube Socket	.35
15919	Phone Condenser	.65
15930	Special Audio Transformer	11.75
15941	Resistor (purple and yellow) (Interchangeable with 16472)	.25
15944	Model Nameplate	.15
15945	Model Nameplate	.10
15946	Shipping Container (Model 60-C) (Superseded by 15688)	
15960	No. 1 A. F. Transformer	4.00
15970	No. 2 A. F. Transformer (Superseded by 18020)	
15972	Mounting Bracket	.10
15977	Variable Condenser Group	6.20
15978	Battery Container	1.30
15984	Tube Nameplate	.10
15990	Literature Assembly (Type Q) net	.20
15997	Tube Nameplate	.20
15998	Model Nameplate	.15
16002	Speaker Plug Socket	.45
16003	Tube Socket	.30
16004	Tube Socket	.30
16006	Tube Socket	.50
16010	Volume Control	5.25
16012	Main Panel Only	1.20
16013	Lamp Socket Assembly	.20
16018	Model Nameplate	.20
16032	Shipping Container (Model 67) (Superseded by 15326)	
16033	Shipping Container (Model 67-C) (Superseded by 15688)	
16034	Rubber Sleeving (Superseded by 16497)	
16035	Insulation (per foot)	.03
16036	Insulation (per foot)	.02
16037	Insulation (per foot)	.02
16038	Insulation (per foot) (Superseded by 16039)	
16039	Insulation (per foot)	.02
16045	Toggle Switch Assembly	1.60
16055	Resistance (Superseded by 15660)	
16056	Resistance (Superseded by 17077)	
16058	Instruction Book (Model 67) net	10
16060	Detector By-Pass (Superseded by 18350)	
16065	Transformer Unit Lid	.40
16066	Instruction Book (Model 55-F) net	.10
16067	Literature Assembly (Model 55-F) (D)	
16068	Shipping Container (Model 55-F) (Superseded by 15326)	

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Part No.	Name of Part	Price
16069	Shipping Container (Model 55-F-C) (Superseded by 15688).	
16071	Shipping Container (Model 61) (Superseded by 15326)	
16072	Shipping Container (Model 61-C) (Superseded by 15688)	
16073	Nameplate	$ .10
16077	Resistance	.25
16081	Resistance (yellow lead)	.15
16082	Double Phone Condenser	.65
16088	Grid Condenser	.20
16098	Group Leads (D)	
16099	Dial Light (6 volt)	.25
16101	Literature Assembly (Model 67) (D)	
16103	"C" Battery Container Lid	.50
16104	Connection Card	.06
16131	Shipping Container (F-4-A) (Superseded by 16215)	
16147	Insulator (3" x 1-3/16")	.50/C
16158	Mounting Screw	.30/C
16159	Front Cover	2.30
16161	Back Cover	2.60
16163	Base	2.80
16165	Battery Cable (Superseded by 9010)	
16166	Battery Cable Tag, used on 9010 Cable	.02
16167	Tube Socket	.60
16168	Rubber Washer	.02
16175	Resistance (Superseded by 16988).	
16176	Resistance (Superseded by 16302).	
16215	Shipping Container (F-2-A)...net	.45
16216	Shipping Container (F-6-A) (Superseded by 16215)	
16217	Shipping Container (F-7-A) (Superseded by 16215)	
16220	Literature Assembly (Type L).net	.20
16232	Condenser Unit Spacer	.20
16233	R. F. By-pass Cond.	.90
16236	Escutcheon (Model 60)	.50
16237	Escutcheon (Model 67)	.50
16238	Escutcheon (Model 61)	.50
16239	Escutcheon (Model 66)	.50
16241	Front Panel Assembly	1.50
16242	Front Panel Assembly	1.50
16243	Front Panel Assembly	1.50
16246	Instruction Book (Model 61)...net	.10
16253	Resistance	.25
16260	Filter Choke	7.50
16270	Volume Control	3.70
16277	Resistance Base (D)	
16279	Dial Light Socket Assembly	1.30
16280	Flexible Resistor	.20
16282	Resistor (blue and red) (Interchangeable with 15287 and 8919)	.25
16283	Toggle Switch Only	1.30
16286	R. F. Choke (Superseded by 17254)	
16288	Tube Nameplate	.25
16289	Tube Nameplate	.25
16290	Flexible Resistor	.20
16291	Tube Nameplate	.15
16295	Resistance	.40

Part No.	Name of Part	Price
16299	Resistance	$ .25
16302	Resistance	.15
16305	Literature Assembly (D)	
16315	White Lead (D)	
16316	Red Lead (D)	
16317	Blue Lead (D)	
16318	1st A. F. Filter Condenser	1.25
16320	Flexible Resistor	.20
16322	Flexible Resistor	.20
16323	Double Phone Condenser	.65
16330	Resistor (flat type)	.40
16339	Resistance Base (D)	
16340	Resistor	.20
16341	Two Resistance Base (D)	
16347	Cone Housing Assembly	1.80
16348	Cone Housing Assembly	1.80
16349	Cone Housing Assembly	2.00
16350	Flexible Resistor	.20
16351	Cone Housing Assembly	1.90
16358	Toggle Switch Assembly	1.30
16360	Stopping or Compensating Condenser	.10
16362	Sub-Base Assembly (D)	
16363	R. F. Coil Group	4.60
16364	Variable Condenser Group	8.20
16365	Base Plate Only (D)	
16370	On-off Switch	1.10
16380	Local Distance Switch	1.25
16390	Output Transformer	3.25
16390-A	Output Transformer (large container)	3.25
16396	Condenser Unit Cover	.55
16410	Field Coil	5.00
16420	Dial-light Socket and Reflector, one-hole mounting (less Resistor and Lead)	.40
16420-A	Dial-light Socket and Reflector, two-hole mounting (less Resistor and Lead)	.40
16430	Tone Control Switch Complete	.75
16432	Fil. Series Resistor No. 2	.40
16433	Fil. Series Resistor No. 1	.40
16434	Resistance	.40
16435	Sub. Panel Assembly (D)	
16436	R. F. Coil Group	4.80
16448	Mounting Screw	.40/C
16456	Shipping Container (Model 66) (Superseded by 18123)	
16461	By-pass Condenser	.75
16462	By-pass Condenser	1.00
16465	Condenser Unit Shield	.25
16468	Sub. Base Assembly (D)	
16469	R. F. Coil Group	5.20
16472	Resistor (purple and red) (Interchangeable with 15941)	.25
16490	Tone Control Condenser	1.00
16492	Felt Foot	.04
16494	Main Panel Only	1.20
16495	Frame Mtg. Screw	.10
16497	Insulation (per foot)	.02
16499	Frame Mtg. Tapped Bushing	.15

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Part No.	Name of Part	Price
16508	Fibre Wire Clamp	$ .50/C
16512	Frame Mtg. Clamp	.05
16514	Volume Control Shaft (D)	
16520	Filter Condenser	7.95
16522	Resistance	.15
16523	Instruction Book (Model 66)..net	.10
16543	Group Leads (D)	
16576	Volume Control Cover	.05
16590	Literature Assembly (Type F).net	.20
16606	Group Leads (D)	
16607	Group Leads (D)	
16608	Group Leads (D)	
16610	Flexible Resistor	.20
16630	Volume-Control	4.50
16631	Bottom Cover	1.70
16632	Front Panel Only	.90
16634	Toggle Switch	1.30
16638	Resistance (Superseded by 15660).	
16639	Resistance	.60
16640	Input Transformer	4.50
16641	Resistance	.60
16642	Volume Control Shaft Washer (D)	
16643	Resistance	.30
16644	Resistance (Superseded by 16295)	
16658	Front Panel Assembly	1.50
16659	R. F. Choke	.50
16660	Power Transformer	7.50
16680	Filter Choke	5.75
16687	Literature Assemb. (Model 66) (D)	
16695	Shipping Container (J B).....net	.35
16703	Volume Control Housing and Res. No. 1 (D)	
16706	Volume Control Contact and Pressure Arm (D)	
16709	Volume Control Resistor No. 2 (D)	
16724	Resistor (white) (Interchangeable with 16725)	.25
16725	Resistor (black and yellow) (Interchangeable with 16724)	.25
16726	Two Resistance Base (D)	
16734	Front Frame	5.50
16735	Front Screen	2.10
16740	On-off Switch	1.10
16741	Insulating Bushing for 110-volt cable	.05
16742	Bushing Retaining Spring	.05
16745	By-pass Cond.	1.00
16750	Local-distance Switch	1.25
16759	Resistance (Superseded by 15660).	
16760	Local-distance Switch	1.25
16768	Resistance (Superseded by 16987)	
16770	On-off Switch	1.60
16771	Rivet	.30/C
16785	Distance Switch Assembly	.60
16788	Distance Switch Condenser	.15
16805	Resistance Base Assembly (D)...	
16822	Group Leads (D)	
16828	Line Condenser	.50
16839	Group Leads (D)	
16840	Flexible Resistor	.20
16849	Insulator	.30/C

Part No.	Name of Part	Price
16850	Flexible Resistor	$ .20
16851	Insulator	.30/C
16852	Insulator	.60/C
16853	Insulator	.60/C
16854	Insulator	.60/C
16858	Resistance (Superseded by 16988)	
16860	Flexible Resistor	.20
16862	Insulator	.60/C
16863	Insulator	.30/C
16868	Resistance (Superseded by one 16988 and one 16989)	
16871	Distance Switch Assembly (Superseded by 16785)	
16872	Resistance (Superseded by one 16253 and one 15660)	
16876	Insulation (per foot)	.02
16880	R. F. By-Pass	1.10
16881	Rivet	.30/C
16890	Filter Choke	8.60
16905	Resistor (Superseded by 17041)..	
16940	R. F. By-Pass	1.10
16955	Balance Weight	.35
16984	R. F. Coil Group	4.40
16985	R. F. Coil Group	5.20
16986	Sub. Base Assembly (D)	
16987	Resistance	.20
16988	Resistance	.15
16989	Resistance	.15
16990	R. F. Coil Group	3.30
16992	Tube Socket	.75
16996	Toggle Switch Assembly	1.10
16998	Tube Socket	.65
17010	Type JB Inductor Speaker	28.00
17016	Resistance (Superseded by 15660).	
17018	Distance Switch Assembly (Superseded by 16785)	
17020	Field Coil	8.00
17040	Phonograph Post Assembly	.45
17041	Resistance	.40
17060	Literature Assembly (Type P).net	.20
17062	Mica Insulator for Variable Condenser Trimmer	.03
17064	Fibre Washer	.30/C
17070	1st A. F. Transformer	4.50
17077	Filament Shunt Resistor	.15
17090	Flexible Resistor	.20
17093	Four Resistance Base (Less Resistors)	.45
17094	R. F. Coil Group (16990 may be used in place of 17094)	3.20
17095	R. F. Coil Group	5.10
17096	R. F. Coil Group	4.70
17107	Rotor Connection (long)	.10
17109	Screw	.30/C
17117	Fibre Pad	.25/C
17118	Mounting Bracket	.05
17119	Metal Clamping Strip	.02
17144	Log Cards..net	.75/C
17155	Resistor (Superseded by 17077)...	
17159	Condenser Assembly	7.50
17160	No. 1 R. F. T. (D)	

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Part No.	Name of Part	Price
17170	No. 2 R. F. T. (D)	
17173	Speaker Choke	$ 2.00
17178	Transformer, Choke and Condenser Assembly (Later Type Model 40)	21.00
17180	No. 3 R. F. T. (D)	
17190	No. 4 R. F. T. (D)	
17204	Lock Washer	.40/C
17205	Dial Knob Bracket	.15
17206	Dial Light Socket	.30
17209	Dial Assembly	.60
17210	Literature Assembly (Type H-1) net	.20
17219	Volume Control Bracket	.20
17223	Cross Piece (10 in. x 7/8 in.)	.25
17224	Front Panel Brace	.10
17230	Trimmer Condenser	.35
17232	Sheet Fibre Insulator (3 in. x ¾ in.)	.25/C
17240	Trimmer Condenser	.50
17244	Volume, Tone, or On-off Switch Knob	.30
17254	R. F. Choke	.50
17260	I. F. Transformer with Bracket	1.35
17268	Power Trans. Cover	.50
17270	Volume Control	5.50
17280	Input Transformer	3.75
17290	Filter Choke	5.75
17291	Rotor Connection (Short)	.10
17295	R. F. Coil Shield	.50
17299	Dial Light Resistor (blue)	.15
17302	Filter-choke Lid	.20
17310	On-off Switch	1.10
17323	Antenna and Ground Post Base only	.05
17326	Detector Cap	.30
17332	Instruction Book (3rd Type 60) net	.10
17341	Mounting Bracket	.05
17342	Fibre Resistor Pad	.25/C
17343	Metal Clamping Strip	.02
17344	Fibre Resistor Pad	.25/C
17345	Metal Clamping Strip	.02
17360	R. F. By-Pass	1.10
17370	R. F. By-Pass	1.10
17377	Socket Insulator (Fibre Sheet)	.25/C
17380	Resistor	.20
17390	Plate Choke	.60
17392	Nameplate	.25
17410	1st-Detector Plate Choke	.35
17420	1st I. F. Plate Choke (Superseded by 18220)	
17429	Filter Cond. Cover	.40
17430	Oscillator Transformer	1.00
17432	Lockwasher	.50/C
17433	Lockwasher	.50/C
17440	1st I. F. Stopping Condenser	.50
17470	1st Detector Plate Condenser	.35
17488	Bolt	.03
17490	R. F. Coil Group	4.00
17507	Nut	.05
17508	Rectifier Socket	.25

Part No.	Name of Part	Price
17509	2A Socket	$ .25
17510	R. F. Coil Group	4.00
17511	2Aa Socket	.25
17512	Speaker Plug Socket	.25
17515	Field Coil Insulator	.02
17516	Screw	.30/C
17518	R. F. Socket	.30
17519	Det. or 1st A. F. Socket	.30
17521	Antenna Binding Post and Base	.45
17522	Screw	.30/C
17524	110 Volt Cable, with Plug	1.90
17527	Shipping Container (3rd Type 60-C) (Superseded by 18123)	
17534	Filter Cond. Spacing Pad	.25/C
17536	Bottom Plate	1.30
17546	Terminal-Card Assembly	.20
17547	Cone Housing Assembly	2.60
17551	Field Coil Only	8.00
17552	Field Coil Spacer	.09
17553	Top Pole Piece	2.75
17556	Cable and Plug Assembly	1.65
17557	Diaphragm Assembly	3.25
17558	Resistor (black and green) (Superseded by 15592)	
17563	Power Trans. Insulating Sheet	.02
17602	Red Lead for Fil. Circuit	.08
17603	Red-green Tracer Lead for Fil. Circuit	.08
17632	Det. Cap Lead (brown)	.10
17679	Rivet for Panel Braces	.01
17736	Volume Control	3.70
17737	R. F. Coil Group	4.00
17738	Variable Cond. Rotor and Frame	9.25
17739	Variable Cond. Assembly. (Use No. 17738)	
17775	Spacer	.02
17790	Multiple-Speaker Output Transformer	15.00
17796	Terminal Card Insulator	.02
17803	Terminal Card Cover	.12
17814	Dial Knob	.30
17816	Speaker Hanger (2 used)	.10
17820	2nd I. F. Stopping Choke (Superseded by 18220)	
17824	Power Transformer Cover	.50
17825	Power Transformer Spring	.10
17827	Cable Clamp	.05
17847	Cone Housing	2.60
17856	Diaphragm Assembly	1.50
17858	Cone-Housing	2.60
17862	Terminal Card	.20
17864	Sound Unit, complete (Type J)	10.90
17864B	Sound Unit (Type JB)	10.90
17866	Cable and Plug Assembly	1.60
17868	Nut	.02
17871	Shipping Container (J) (Superseded by 19336)	
17872	Instruction Sheet (J) net	.02
17876	Volume Control Bracket	.20
17885	Instruction Book (Type Q) net	.10
17889	Terminal Card	.12

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Part No.	Name of Part	Price
17890	Centralized Control Multiple Speaker Installation	$85.00
17895	Cable and Plug Assembly	1.65
17931	Transformer, Filter Choke Assembly (Later Model 40)	14.50
17934	Dial Gear (Superseded by 18615)	
17935	Dial-Knob Bracket Support (Threaded)	.03
17936	Dial-Knob Bracket (1-hole mount.)	.35
17941	Dial-Knob Shaft	.05
17959	Dial Pointer	.05
17961	Dial Rubber and Bushing	.15
17962	Pointer Control Arm	.30
17974	2nd-Detector Stopping Condenser	.35
17985	Escutcheon	1.00
17989	Tuned-Radio-Frequency Nameplate (Type L-F-P)	.06
18007	Speaker-Plug Socket	.30
18016	Speaker-Plug Socket Insulator	.25/C
18020	Input Transformer	5.25
18049	Tubular Resistor (Green and Blue)	.30
18051	Instruction Book (Type D) net	.10
18055	Top Pole Piece	1.25
18068	Instruction Sheet (N) net	.02
18073	Cone-Housing, with Terminal Card	2.60
18075	Field-Coil Spacer	.09
18081	Diaphragm Assembly	3.25
18085	Front Panel, with Dial Plate	1.25
18092	Screw	.04
18093	Field-Coil Insulator	.02
18095	Lockwasher	.40/C
18112	Tone-Control Switch Blade	.03
18113	Tuned-Radio-Frequency Nameplate (Type D)	.06
18114	Tuned-Radio-Frequency Nameplate (Type Q)	.06
18117	Balance Weight	.35
18118	Guide Card (Form 680) net	.75/C
18119	Log Card (Form 681) net	.75/C
18120	No. 2 R. F. Transformer (D)	
18122	Instruction Book (Type L) net	.10
18123	Shipping Container (Type L) net	.65
18127	Washer	.45/C
18144	Dial-Knob Bracket	.35
18146	Tone-Control Switch Shaft	.12
18148	Tone-Control Switch Base	.60
18150	I. F. Trimmer (Double Type)	.95
18160	1st-Detector Plate Choke	1.00
18174	Metal Washer	.35/C
18180	Literature Assem. (Type H-2) net	.20
18188	Filter-Condenser Cover	.45
18220	R. F. or I. F. Choke	.25
18222	Screw	.40/C
18223	Tone-Control Condenser Clamp	.05
18232	Filter-Choke Base Plate	.10
18236	Dial-Light Resistor (Yellow Lead)	.15
18256	Instruction Book (Type F) net	.10
18257	Shipping Container (Type F) net	.65
18259	Volume-Control Bracket	.20
18261	R. F. and I. F. Transformer Shield	.50
18271	Transformer Bracket	.10
18273	Spacer	$ .03
18283	Mounting Bracket	.05
18286	Shield Between I. F. Transformers	.20
18295	Eyelet	.20/C
18303	Screw	.30/C
18315	Screw	.01
18325	Bracket Screw	.05
18327	R. F. Coil Group	4.00
18339	Panel Stud	.05
18350	R. F. By-pass	1.10
18354	Filament Series Resistor No. 2	1.00
18355	Filament Series Resistor No. 1	1.00
18356	A. F. Filament Shunt Resistor	1.00
18388	Hexagon Nut	.25
18389	Unit Strap	.05
18391	Unit-Strap Screw	.02
18398	2A Socket	.25
18399	2Aa Socket	.25
18405	Filter Choke Lid (Superseded by 18638)	
18417	R. F. Socket	.25
18418	Socket	.25
18419	Grid-Condenser Assembly (With Socket)	.65
18449	Fuse Socket	.15
18485	Shipping Container (Type Q) net	.65
18489	Shipping Container (Type D) net	.65
18493	Bottom Plate	1.30
18534	Line Fuse (2 amperes)	.05
18542	Instruction Sheet (N-3) net	.02
18544	Phono-Radio Switch	1.25
18546	Binding Post (Marked G)	.20
18547	Shipping Container (Type P) net	.65
18548	Instruction Book (Type P) net	.10
18551	Escutcheon	1.00
18566	Super-heterodyne Nameplate (Type H)	.06
18573	Instruction Sheet (JB) net	.02
18577	Frame	3.75
18578	Felt Insulator	.75/C
18579	Variable Condenser, Stator, Rotor and Frame (With Balance Weight and Leads)	9.60
18581	Front Panel, complete	2.50
18582	Speaker Plug	.65
18615	Dial Gear	.40
18638	Filter Choke Lid with Nameplate	.20
18645	Power Transformer Lid, with Nameplate	.20
18649	Volume-Control Nut (Type H)	.03
18652	Instruction Book (Type H-1) net	.10
18661	Shipping Container (Type H) net	.65
18774	Tube Socket	.30
18866	Stopping Spring	.12
18911	Special Transformer for Test Equipment	8.00
18917	Spacer	.04
18935	Additional Four-Wire Cable, per foot	.12
18945	Additional Twenty-Wire Cable, per foot	.50

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Part No.	Name of Part	Price
19014	Fibre Washer	$ .50/C
19033	Intermediate Frequency Transf.	1.25
19034	Variable Condenser, Rotor, Stator and Frame, with Balance Weight and Leads	9.60
19035	Front Panel, complete	2.50
19036	Front Panel, with Dial Plate	1.50
19038	R. F. Coil Group	4.00
19043	Metal Glider (For Cabinet Feet)	.04
19056	*Pickup Unit, complete, less Arm*	*12.50*
19057	*Pickup Coil*	*.50*
19058	*Pickup Armature*	*.30*
19059	*Pickup Pole Piece (Left-Hand)*	*.40*
19061	*Pickup Magnet*	*2.60*
19063	*Pickup Cover*	*.50*
19065	*Pickup Pole Piece (Right-Hand)*	*.40*
19066	*Pickup Needle Screw*	*.08*
19067	*Pickup Connector Block and Wire*	*1.10*
19068	*Pickup Arm and Base, less Unit*	*5.50*
19069	*Pickup Arm Trip Rod and Nut*	*.04*
19071	*60-Cycle Induction-Disc Motor*	*36.50*
19072	*Rotor Disc*	*4.00*
19073	*60-Cycle Inductor*	*10.00*
19074	*Governor, complete*	*2.50*
19075	*Governor Ball and Spring*	*.10*
19076	*Governor Bearing*	*.03*
19077	*Volume Control, complete, less Knob*	*1.40*
19078	*Volume-Control Cord*	*.25*
19079	*Volume Control Knob*	*.30*
19081	*Brake Switch*	*1.50*
19082	*Turntable-Spindle Ball-Bearing*	*.01*
19083	*Needle Box*	*.30*
19084	*Needle Cup*	*.15*
19085	*Top-Plate Washer*	*.01*
19086	*Turntable-Spindle Ball-Bearing Screw ... doz.*	*.36*
19087	*Pickup Input Transformer*	*5.50*
19092	*Pickup-Arm Trip-Rod Nut*	*.01*
19093	*Pickup-Cover Screw*	*.03*
19094	*Pickup-Magnet Spring (flat) ... doz.*	*.10*
19095	*Pickup Pole Piece Nut ... doz.*	*.12*
19096	*Pickup Mounting Screw*	*.02*
19097	*Pickup Mounting Nut*	*.04*
19098	*Pickup Mounting Lock Washer doz.*	*.06*
19099	*Pickup-Arm Wood Screw ... doz.*	*.20*
19101	*Pickup-Coil Insulator ... doz.*	*.05*
19102	*Pickup-Unit Back*	*.50*
19103	*Inductor Screw ... doz.*	*.25*
19104	*Inductor Terminal Block*	*.20*
19105	*Inductor Connector-Wire Clip ... doz.*	*.08*
19106	*Inductor Connector Wire*	*.20*
19107	*Nut*	*.01*
19108	*Turntable-Spindle Ball-Bearing Lockwasher*	*.02*
19109	*Set-Screw ... doz.*	*.15*
19111	*Governor Spindle*	*.75*
19112	*Governor-Spindle Collar*	*.20*
19113	*Governor-Spindle-Col. Set-Screw. doz.*	*.12*
19114	*Governor-Ball-and-Spring Screw. doz.*	*.12*
19115	*Governor-Ball-and-Spring Washer doz.*	*.03*
19116	*Governor Bearing (Grooved)*	*.03*
19117	*Governor-Bearing Ball*	*$ .01*
19118	*Governor-Bearing Set-Screw ... doz.*	*.12*
19119	*Top Plate*	*5.00*
19121	*Governor Friction*	*.75*
19122	*Regulating-Shaft Spring*	*.02*
19123	*Regulating Lever*	*.15*
19124	*Regulating-Lever Set-Screw*	*.02*
19125	*Regulating-Lever Leather*	*.01*
19126	*Top-Plate Bolt*	*.10*
19127	*Top-Plate Spacing Cushion (Large)*	*.06*
19128	*Top-Plate Lockwasher ... doz.*	*.10*
19131	*Top-Plate Bolt "C" Washer*	*.03*
19133	*Turntable-Spindle-Governor Drive Gear*	*.30*
19134	*Regulating Shaft*	*.12*
19135	*Motor-Cord Clip*	*.04*
19136	*Motor-Cord-Clip Wood Screw ... doz.*	*.04*
19137	*Motor-Cord Eyelet ... doz.*	*.16*
19138	*Volume-Control Washer ... doz.*	*.12*
19139	*Volume-Control Nut*	*.08*
19141	*Volume-Control Connection Screw doz.*	*.06*
19143	*Top-Plate Rubber Cushion (Small)*	*.06*
19144	*Motor-Cord Connector (Outlet to Set)*	*.60*
19145	*Brake, complete*	*3.40*
19146	*Volume-Control-Knob Set-Screw. doz.*	*.06*
19147	*Brake and Friction Lever Spring*	*.05*
19148	*Brake-Latch Trip Spring*	*.06*
19149	*Brake-Latch Trip*	*.20*
19151	*Brake Latch Trip Rivet*	*.02*
19152	*Brake Hand Lever Spring*	*.05*
19153	*Regulating-Screw Escutcheon and Screw*	*.23*
19154	*Regulating-Screw-Escutcheon Wood Screw ... doz.*	*.12*
19155	*Brake-Switch Screw*	*.02*
19156	*Brake-Switch Washer*	*.04*
19157	*Brake-Switch Bushing Nail ... doz.*	*.08*
19158	*Brake-Switch Cord Bushing*	*.12*
19159	*Brake-Latch Spring*	*.06*
19161	*Brake Wood Screw ... doz.*	*.10*
19162	*Brake-Latch Plate*	*.06*
19163	*Brake-Latch-Plate Screw ... doz.*	*.08*
19164	*Turntable Spindle*	*.75*
19165	*Motor-Board Ferrule*	*.10*
19166	*Turntable-Spindle Pin*	*.02*
19167	*Motor-Bd. Ferrule Wood Screw. doz.*	*.08*
19168	*Turntable (with covering)*	*4.00*
19169	*Turntable Covering*	*1.50*
19176	Washer	.25/C
19187	Screw	.08
19192	Instruction Book (Type H-2) .. net	.10
19225	2nd-I. F. Transformer	2.00
19226	2nd-Detector I. F. Transformer	2.00
19230	Multiple Speaker Installation, less Transformer	70.00
19324	Variable Condenser, Stator, Rotor and Frame (with Balance Weight and Leads)	9.60
19325	No. 1 R. F. Transformer (D)	
19326	Antenna Trimmer	.60
19336	Shipping Container (J) ... net	.35

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Part No.	Name of Part	Price
19345	Terminal Card	$ .20
19346	Tubular Resistor (Red and Green)	.30
19353	*Transformer Leads*	*.30*
19354	*Speed Tag*	*.01*
19355	*60-Cycle Tag*	*.01*
19358	*Armature Spacing Cushion*.....*doz.*	*.12*
19359	*Light Grease (Can)*	*.25*
19361	*Heavy Grease (Tube)*	*.25*
19362	*Stroboscope Disc (60 cycles)*	*.05*
19364	*Damper Rubber*	*.06*
19365	*Damper Plate*	*$ .10*
19387	*Damper Plate Screw*.....*doz.*	*.14*
19447	*Pick-up Pole Piece Screw*.....*doz.*	*.12*
19497	R. F. Coil Group	4.00
	Special Shielded Cable.....ft.	.08
	2-Conductor Cable.....ft.	.08
	3-Conductor Cable.....ft.	.10
	4-Conductor Cable.....ft.	.12
	5-Conductor Cable.....ft.	.14
	Trimmer Cond. Sealing Wax.....lb.	.50

February, 1931. This list supersedes all previous lists. Prices are subject to change without notice.
Parts not carried in stock are indicated by capital D in parenthesis; thus (D).
Phonograph parts are listed in italics.

ATWATER KENT RADIO

Service Data, Parts List, and Price List for

MODEL 60-C [3RD TYPE]

Serial No. 5,670,001 to 5,684,000

Model 60-C is a chassis-type, screen-grid, electro-dynamic radio receiver, designed for 110-120 volt, 50-60 cycle, A. C. operation

As a result of the adoption of numerous laboratory developments which have been rigorously checked by extensive preliminary trials, the 3rd type of Model 60-C possesses many electrical and mechanical refinements which give to this model a number of very desirable improvements.

Electrically, the principal difference is in the arrangement of the R. F. amplifying circuit. Mechanically, the principal difference is in the design of the variable-condenser unit. These differences are tabulated on Page 202.

The improvements resulting from these changes are summarized below. It is important to remember that the following list gives only the improvements; in addition to these improvements, the 3rd type of Model 60-C has all the features of superiority which are described on Page 115 of this manual.

1. EXACT SYNCHRONISM. This is due to the exact mechanical construction of the variable-condenser unit.
2. UNIFORM SENSITIVITY.
3. UNIFORM SELECTIVITY.
4. UNIFORM DIAL SETTINGS. The same station is tuned in at almost identically the same dial number on all 3rd-type Model 60-C receivers. This feature is secured by strict uniformity of R. F. transformers and by the great accuracy in condenser construction.
5. EASILY ACCESSIBLE PARTS. The simple mechanical construction, quickly removable plug-in-type R. F. coil shields, one-bolt R. F. transformer-mounting brackets, air-cooled power transformer, separate tube sockets, direct wiring, complete service information with "picture drawings"—all these help to make servicing easy, quick and certain.

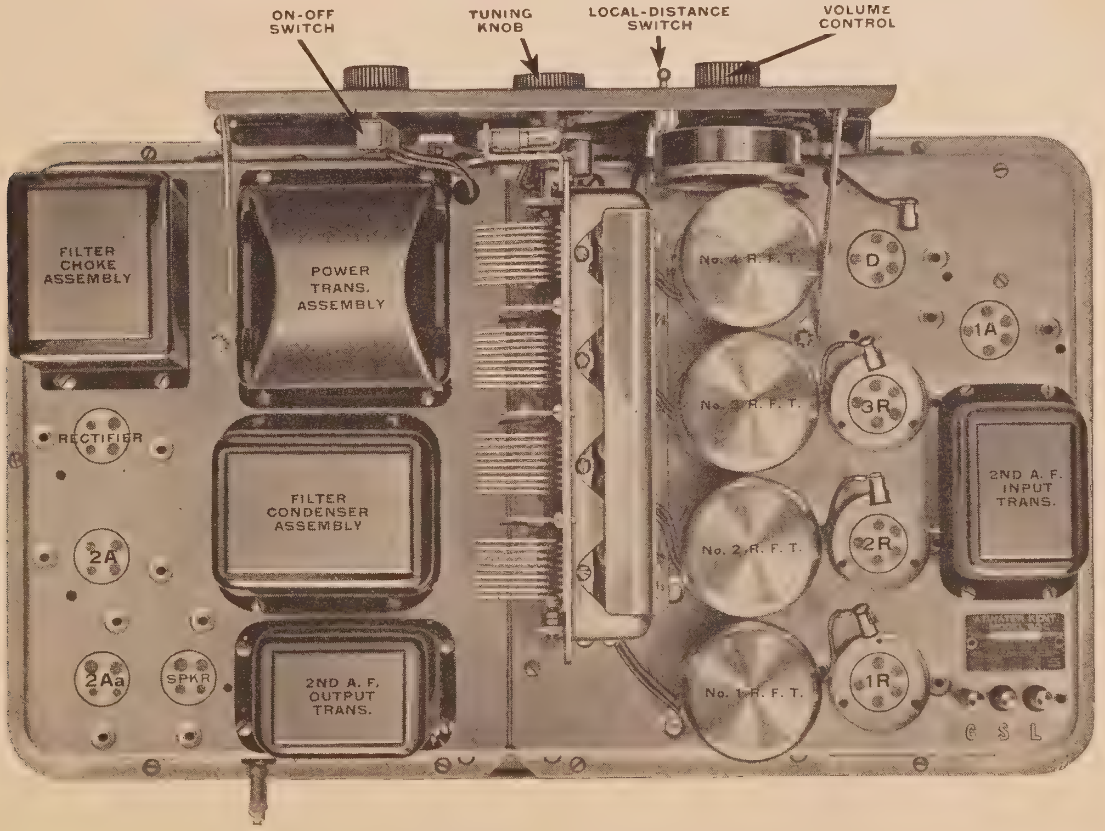
ON-OFF SWITCH
TUNING KNOB
LOCAL-DISTANCE SWITCH
VOLUME CONTROL
FILTER CHOKE ASSEMBLY
POWER TRANS. ASSEMBLY
No. 4 R. F. T.
D
1A
No. 3 R. F. T.
3R
RECTIFIER
FILTER CONDENSER ASSEMBLY
2ND A. F. INPUT TRANS.
2A
No. 2 R. F. T.
2R
2Aa
SPKR
2ND A. F. OUTPUT TRANS.
No. 1 R. F. T.
1R
G S L

Fig. 201. Top View of 3rd Type of Model 60-C.

May, 1930.

Comparison of the Three Types of Model 60-C

Like the two preceding types of Model 60-C, the 3rd type has three stages of screen-grid radio-frequency amplification, a detector, one stage of resistance-coupled audio-frequency amplification, and a "double-audio" output stage.

The principal differences between the three types are as follows:—

	IN THE FIRST TYPE	IN THE SECOND TYPE	IN THE THIRD TYPE
VOLUME CONTROL	A **single** volume control regulates the screen-voltage.	A **dual-type** volume control— 1. Regulates the amount of R.F. energy transferred from the 1st- to the 2nd-R.F. tube. 2. Regulates the screen-voltage.	A **dual-type** volume control— 1. Regulates the amount of R.F. energy transferred from the antenna circuit to the 1st-R.F. tube. 2. Regulates the R.F. control-grid voltage.
LOCAL-DISTANCE SWITCH	The local-distance switch is connected to the primary of No. 2 R.F.T. **(between the 1st and 2nd R.F. tubes).** In the distance position, the switch cuts in the entire primary of No. 2 R.F.T., thus giving three straight stages of R.F. amplification. In the local position, the switch cuts out a part of the primary of No. 2 R.F.T., thus reducing the total R.F. amplification.	The local-distance switch is connected to the 2nd stopping condenser **(between the 2nd- and 3rd-R.F. tubes).** In the distance position, the switch connects the 2nd stopping condenser to the plate of the 2nd-R.F. tube, thus giving three straight stages of R.F. amplification. In the local position, the switch connects the 2nd stopping condenser to the +B side of the plate-circuit of the 2nd-R.F. tube, thus reducing the total R.F. amplification.	The local-distance switch is connected to the secondary of No. 1 R.F.T. **(ahead of the 1st-R.F. tube).** In the distance position, the switch connects the grid-return lead of the 1st-R.F. tube to the chassis, thus giving three straight stages of R.F. amplification. In the local position,* the switch connects the grid-return lead of the 1st-R.F. tube to a coupling coil (on the 2nd-R.F. transformer) and then to the bias circuit of the 2nd-A.F. tubes. The coupling coil provides coupling between the 1st and 2nd tuned circuits, and the high negative grid bias makes the 1st-R.F. tube inoperative, thus reducing the total R.F. amplification.
R.F. TRANSFORMERS	The R.F. transformers are **inductively coupled.**	The R.F. transformers are **auto-transformer coupled.**	The R.F. transformers are **auto-transformer coupled.**
VARIABLE CONDENSERS	Both the 1st and 2nd types have four separate variable condensers controlled by pulleys and belts.		The variable condensers are of the "multiple" type, with the four rotors mounted on a common shaft.

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* If, in the "local" position, the volume is not sufficiently reduced, the 1st-R.F. tube should be changed.

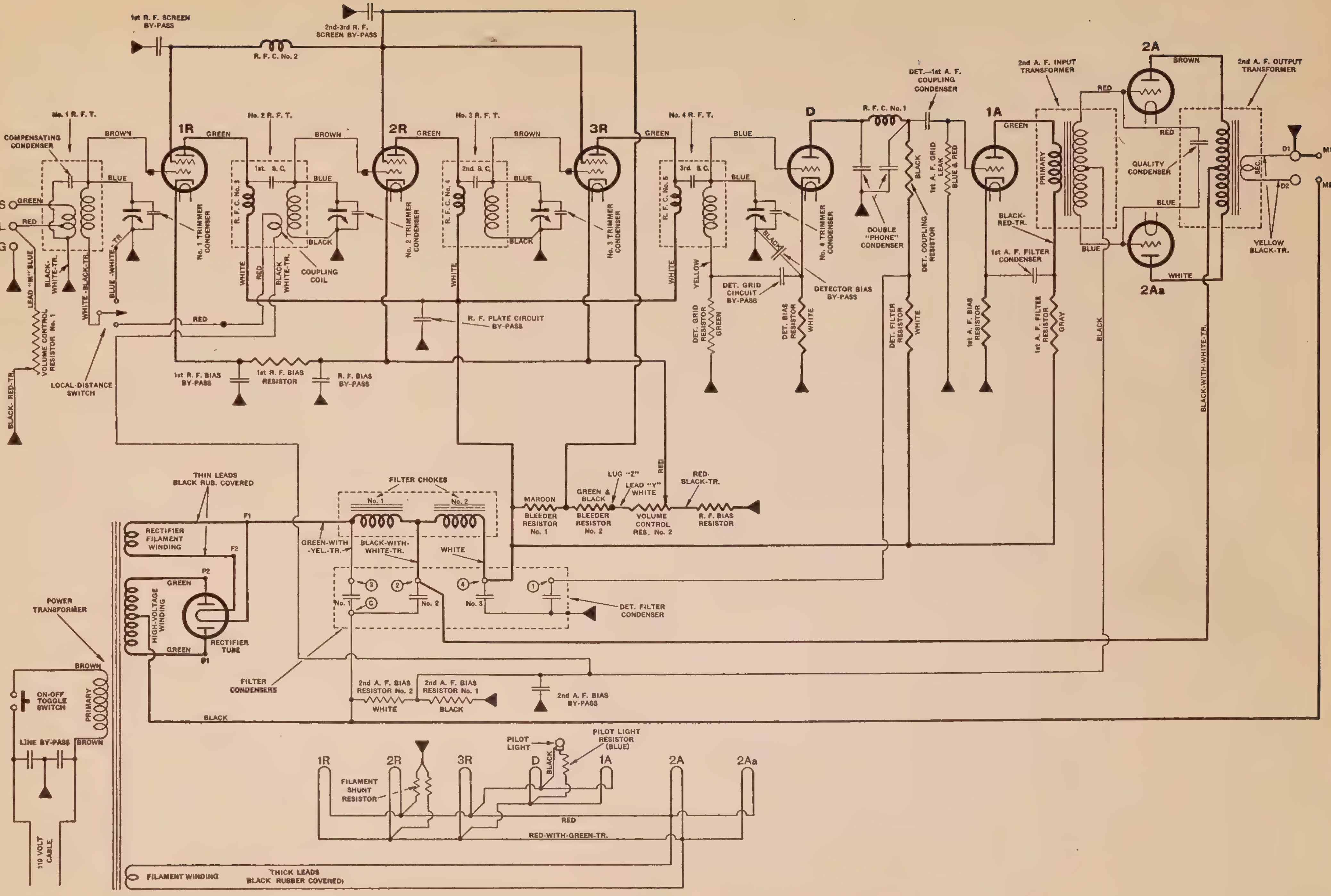

1st R. F. SCREEN BY-PASS
2nd-3rd R. F. SCREEN BY-PASS
R. F. C. No. 2
No. 1 R. F. T.
No. 2 R. F. T.
No. 3 R. F. T.
No. 4 R. F. T.
COMPENSATING CONDENSER
1R
2R
3R
D
1A
2A
2Aa
BROWN
GREEN
BLUE
BLACK
WHITE
RED
YELLOW
GRAY
1st. S.C.
2nd. S.C.
3rd. S.C.
R. F. C. No. 3
R. F. C. No. 4
R. F. C. No. 5
R. F. C. No. 1
No. 1 TRIMMER CONDENSER
No. 2 TRIMMER CONDENSER
No. 3 TRIMMER CONDENSER
No. 4 TRIMMER CONDENSER
COUPLING COIL
BLACK-WHITE-TR.
WHITE-BLACK-TR.
BLUE-WHITE-TR.
LEAD "M" BLUE
VOLUME CONTROL RESISTOR No. 1
BLACK-RED-TR.
LOCAL-DISTANCE SWITCH
S
L
G
R. F. PLATE CIRCUIT BY-PASS
1st R. F. BIAS BY-PASS
1st R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
DET. GRID CIRCUIT BY-PASS
DETECTOR BIAS BY-PASS
DET. GRID RESISTOR
DET. BIAS RESISTOR
DOUBLE "PHONE" CONDENSER
DET.—1st A. F. COUPLING CONDENSER
DET. COUPLING RESISTOR
1st A. F. GRID LEAK
BLUE & RED
DET. FILTER RESISTOR
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
1st A. F. FILTER CONDENSER
BLACK-RED-TR.
2nd A. F. INPUT TRANSFORMER
PRIMARY
QUALITY CONDENSER
2nd A. F. OUTPUT TRANSFORMER
SEC.
D1
D2
M1
M2
YELLOW BLACK-TR.
BLACK-WITH-WHITE-TR.
THIN LEADS BLACK RUB. COVERED
RECTIFIER FILAMENT WINDING
F1
F2
P1
P2
HIGH-VOLTAGE WINDING
RECTIFIER TUBE
POWER TRANSFORMER
FILTER CHOKES
No. 1
No. 2
GREEN-WITH-YEL.-TR.
BLACK-WITH-WHITE-TR.
MAROON
BLEEDER RESISTOR No. 1
GREEN & BLACK
BLEEDER RESISTOR No. 2
LUG "Z"
LEAD "Y" WHITE
VOLUME CONTROL RES. No. 2
RED-BLACK-TR.
R. F. BIAS RESISTOR
①
②
③
④
Ⓒ
No. 1
No. 2
No. 3
DET. FILTER CONDENSER
FILTER CONDENSERS
2nd A. F. BIAS RESISTOR No. 2
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS BY-PASS
ON-OFF TOGGLE SWITCH
PRIMARY
LINE BY-PASS
110 VOLT CABLE
PILOT LIGHT
PILOT LIGHT RESISTOR (BLUE)
FILAMENT SHUNT RESISTOR
RED-WITH-GREEN-TR.
FILAMENT WINDING
THICK LEADS BLACK RUBBER COVERED)

FIG. 202. SCHEMATIC DIAGRAM OF 3RD TYPE OF MODEL 60-C.

In the above diagram, "S.C." means stopping condenser.

In later types of this model, the leads from the filament winding are covered with light gray rubber or black sleeving, and the grid-return of No. 4 R.F.T. is yellow-with-black-tracer instead of yellow.

In a few of these models, the quality condenser is connected across the primary of the output transformer, the connections being made inside the unit:

In these sets, the output transformer has five leads instead of seven.

3rd Type Model 60-C

(Serial No. 5,670,001 to 5,684,000)

Condensers in R.F. By-Pass No. 1

L—Line by-pass.
L—Line by-pass.
C—2nd-A.F. bias by-pass.
E—1st-R.F. screen by-pass.

Condensers in R.F. By-Pass No. 2

A—1st-R.F. bias by-pass.
B—R.F. bias by-pass.
U—1st-A.F. filter condenser.

Condensers in R.F. By-Pass No. 3

D—Detector bias by-pass.
H—R.F. plate-circuit by-pass.
T—Detector grid-circuit by-pass.

Condensers in Detector By-Pass.

F—2nd-3rd R.F. screen by-pass.
M—Detector-1st A.F. coupling condenser.
P—Phone condenser.
P—Phone condenser.

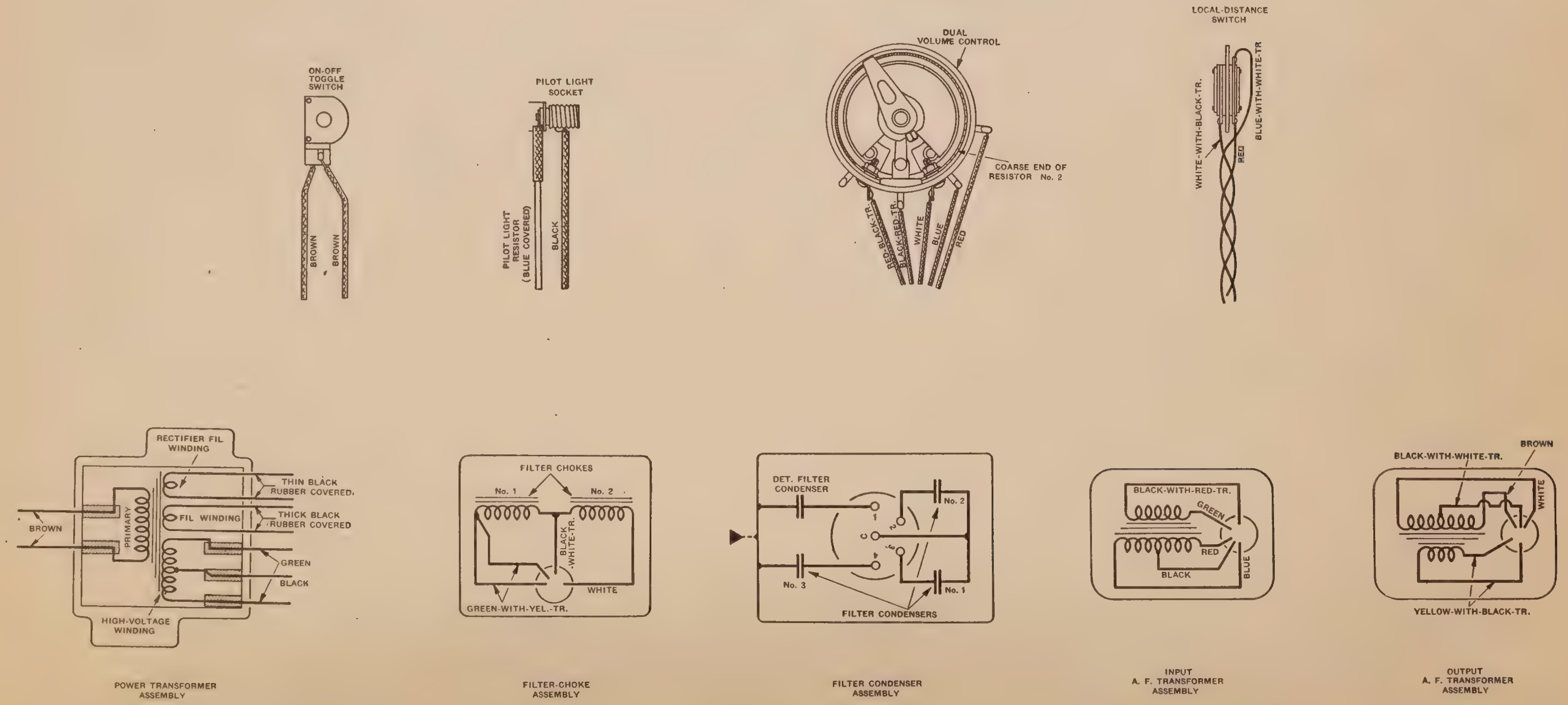

ON-OFF TOGGLE SWITCH
BROWN
BROWN
PILOT LIGHT SOCKET
PILOT LIGHT RESISTOR (BLUE COVERED)
BLACK
DUAL VOLUME CONTROL
COARSE END OF RESISTOR No. 2
RED-BLACK-TR.
BLACK-RED-TR.
WHITE
BLUE
RED
LOCAL-DISTANCE SWITCH
WHITE-WITH-BLACK-TR.
RED
BLUE-WITH-WHITE-TR.
RECTIFIER FIL WINDING
THIN BLACK RUBBER COVERED.
FIL WINDING
THICK BLACK RUBBER COVERED
BROWN
PRIMARY
GREEN
BLACK
HIGH-VOLTAGE WINDING
POWER TRANSFORMER ASSEMBLY
FILTER CHOKES
No. 1
No. 2
BLACK-WHITE-TR.
WHITE
GREEN-WITH-YEL.-TR.
FILTER-CHOKE ASSEMBLY
DET. FILTER CONDENSER
No. 2
No. 3
No. 1
FILTER CONDENSERS
FILTER CONDENSER ASSEMBLY
BLACK-WITH-RED-TR.
GREEN
RED
BLACK
BLUE
INPUT A. F. TRANSFORMER ASSEMBLY
BROWN
BLACK-WITH-WHITE-TR.
WHITE
YELLOW-WITH-BLACK-TR.
OUTPUT A. F. TRANSFORMER ASSEMBLY

FIG. 203. CONNECTIONS OF UNITS IN 3RD TYPE OF MODEL 60-C.

In later types of this Model, the red-with-black tracer lead on the volume control is replaced by a brown-with-white-diagonal-tracer lead which is the R.F. bias resistor. The bottom wiring connections for this later-type Model 60-C are shown on Page 207. Connections of the R.F. coil group are given on Page 212.

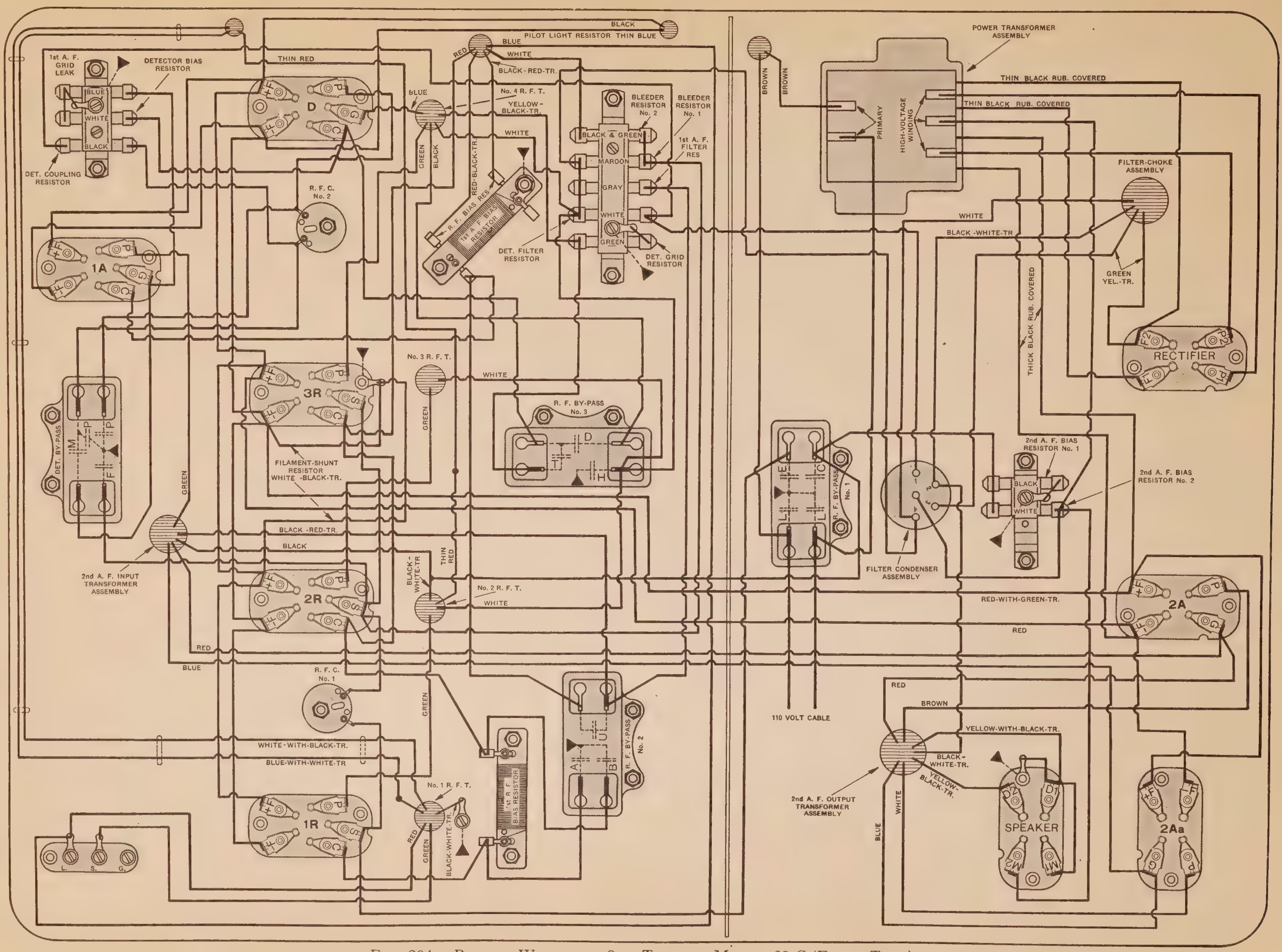

1st A. F. GRID LEAK
DETECTOR BIAS RESISTOR
BLUE
WHITE
BLACK
DET. COUPLING RESISTOR
THIN RED
D
R. F. C. No. 2
1A
DET. BY-PASS
M
P
F
2nd A. F. INPUT TRANSFORMER ASSEMBLY
3R
FILAMENT-SHUNT RESISTOR WHITE -BLACK-TR.
2R
RED
BLUE
R. F. C. No. 1
WHITE-WITH-BLACK-TR.
BLUE-WITH-WHITE-TR
1R
L.
S.
G.
BLACK
PILOT LIGHT RESISTOR THIN BLUE
RED
WHITE
BLACK - RED-TR.
No. 4 R. F. T.
YELLOW - BLACK-TR.
GREEN
RED-BLACK-TR
R. F. BIAS RES.
1st A. F. BIAS RESISTOR
DET. FILTER RESISTOR
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
1st A. F. FILTER RES
BLACK & GREEN
MAROON
GRAY
DET. GRID RESISTOR
No. 3 R. F. T.
R. F. BY-PASS No. 3
D
H
BLACK -RED-TR.
BLACK - WHITE-TR
THIN RED
No. 2 R. F. T.
No. 1 R. F. T.
BLACK-WHITE-TR.
1st R F BIAS RESISTOR
R. F. BY-PASS No. 2
A
B
BROWN
POWER TRANSFORMER ASSEMBLY
PRIMARY
HIGH-VOLTAGE WINDING
THIN BLACK RUB. COVERED
FILTER-CHOKE ASSEMBLY
BLACK -WHITE-TR
GREEN YEL.-TR.
THICK BLACK RUB. COVERED
RECTIFIER
R. F. BY-PASS No. 1
E
C
L
FILTER CONDENSER ASSEMBLY
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS RESISTOR No. 2
RED-WITH-GREEN-TR.
2A
110 VOLT CABLE
YELLOW-WITH-BLACK-TR.
BLACK - WHITE-TR.
YELLOW - BLACK-TR.
2nd A. F. OUTPUT TRANSFORMER ASSEMBLY
SPEAKER
2Aa

Fig. 204. Bottom Wiring of 3rd Type of Model 60-C (Early Type).
The R.F. bias resistor is mounted under the 1st-A.F. bias resistor with a sheet of insulating fibre between the two resistors. In later types of this model, the 1st-A.F. grid leak is blue and red instead of blue. The blue-with-white-tracer lead from the local-distance switch is connected to the black lead from the rotor of No. 1 V. C.

VOLTAGE TESTS

Operating voltage tests provide a quick and accurate method of checking circuit continuity and finding the general location of any defect. Then, if necessary, continuity tests may be used to narrow down the search to the specific part or connection that is causing trouble.

Procedure: Connect the set for operation, with all tubes and the speaker-plug in their sockets, and measure the voltages at the tube sockets as outlined on Page 208.

The voltage table on Page 208 lists the parts that may possibly be "open" if there is a lack of voltage on any circuit. HOWEVER, IT IS IMPORTANT TO REALIZE THAT LOW VOLTAGE, OR NO VOLTAGE, MAY BE CAUSED BY A SHORTED FILTER, BY-PASS, COUPLING, OR STOPPING CONDENSER, OR BY A GROUNDED CIRCUIT.

The voltage values given in the table on Page 208 were taken with the volume control turned to the position of minimum volume (anti-clockwise). Turning the volume control to the maximum-volume position reduces the R.F. control-grid voltage, and this reduces the R.F. plate and screen voltages. The voltages for maximum volume are approximately as follows (for a 120-volt line):

TUBE	CONTROL-GRID VOLTAGE	PLATE VOLTAGE	SCREEN VOLTAGE
1st-R.F.	8	145	110
2nd-R.F.	5	145	110
3rd-R.F.	5	145	110
Detector	0.8	95	...
1st-A.F.	1	60	...

The voltages on the other tubes remain practically the same as the values given in the table on Page 208.

CONTINUITY TESTS

After making operating-voltage tests, continuity tests may be used if necessary to locate the exact cause of trouble in a set.

The continuity tests given in the table on Page 209 were made with the testing circuit shown in Figure 209. The readings given in the table will be somewhat different if a meter is used having a resistance other than that specified.

BEFORE MAKING ANY CONTINUITY TESTS, IT IS ADVISABLE TO CHECK EACH CONDENSER IN THE SET FOR SHORT CIRCUITS.

When lead "Y" is unsoldered from lug "Z," the +B circuit is isolated from the chassis. Therefore, by testing from the filament of the rectifier tube (F1), to the chassis, there should be no reading on the continuity meter. If there is any reading, either some part of the +B circuit is grounded, or one or more of the following condensers is shorted: Filter condenser No. 1, 2, or 3, R.F. plate-circuit by-pass, 1st or 2nd stopping condensers, 1st-R.F. screen by-pass, 2nd — 3rd-R.F. screen by-pass, detector filter condenser, "phone" condenser, detector—1st-A.F. coupling condenser, or 1st-A.F. filter condenser.

The other condensers in the set may be checked, if necessary, by unsoldering all leads to their terminals and testing across each condenser separately.

TABLE OF CONDENSERS, WHICH, IF SHORTED, MAY CAUSE LOW PLATE, SCREEN, OR GRID VOLTAGE IN 3rd TYPE MODEL 60-C.

	LOW VOLTAGE, OR NO VOLTAGE ON—	MAY BE CAUSED BY A SHORTED—	OR BY A GROUNDED—
ALL TUBES	Plates, screens, and grids of ALL tubes.	Filter condenser No. 1, No. 2, or No. 3, R.F. plate-circuit by-pass, 1st stopping condenser, or 2nd stopping condenser.	Filter choke, 2nd-A.F. plate circuit, or R.F. plate circuit.
R.F. TUBES ONLY	R.F. screens and grid.	1st-R.F. screen by-pass, or 2nd-3rd-R.F. screen by-pass.	R.F.C. No. 2, or screen circuit.
	1st-R.F. grid.	1st-R.F. bias by-pass.*	1st-R.F. cathode circuit.
	2nd- and 3rd-R.F. grids.	R.F. bias by-pass.	2nd—3rd-R.F. cathode circuit.
DET. TUBE ONLY	Detector plate and grid.	Detector filter condenser, or "phone" condenser.	R.F.C. No. 1, or detector plate circuit.
	Detector grid.	Detector grid-circuit by-pass, or detector bias by-pass.**	Detector cathode circuit.
A.F. TUBES	1st-A.F. plate.	1st-A.F. filter condenser.***	1st-A.F. plate circuit.
	1st-A.F. grid.	(If the 1st-A.F. grid is positive, the detector-1st-A.F. coupling condenser may be shorted.)	1st-A.F. cathode circuit.
	2nd-A.F. grids.	2nd-A.F. bias by-pass.	2nd-A.F. grid circuit.

---

* With the switch at local, if the 1st-R.F. and the 2nd-A.F. grid bias is low, the compensating condenser may be shorted.
** If the detector grid is positive, the 3rd stopping condenser may be shorted.
*** If the 1st-A.F. filter condenser is shorted, the 1st-A.F. bias will be high.

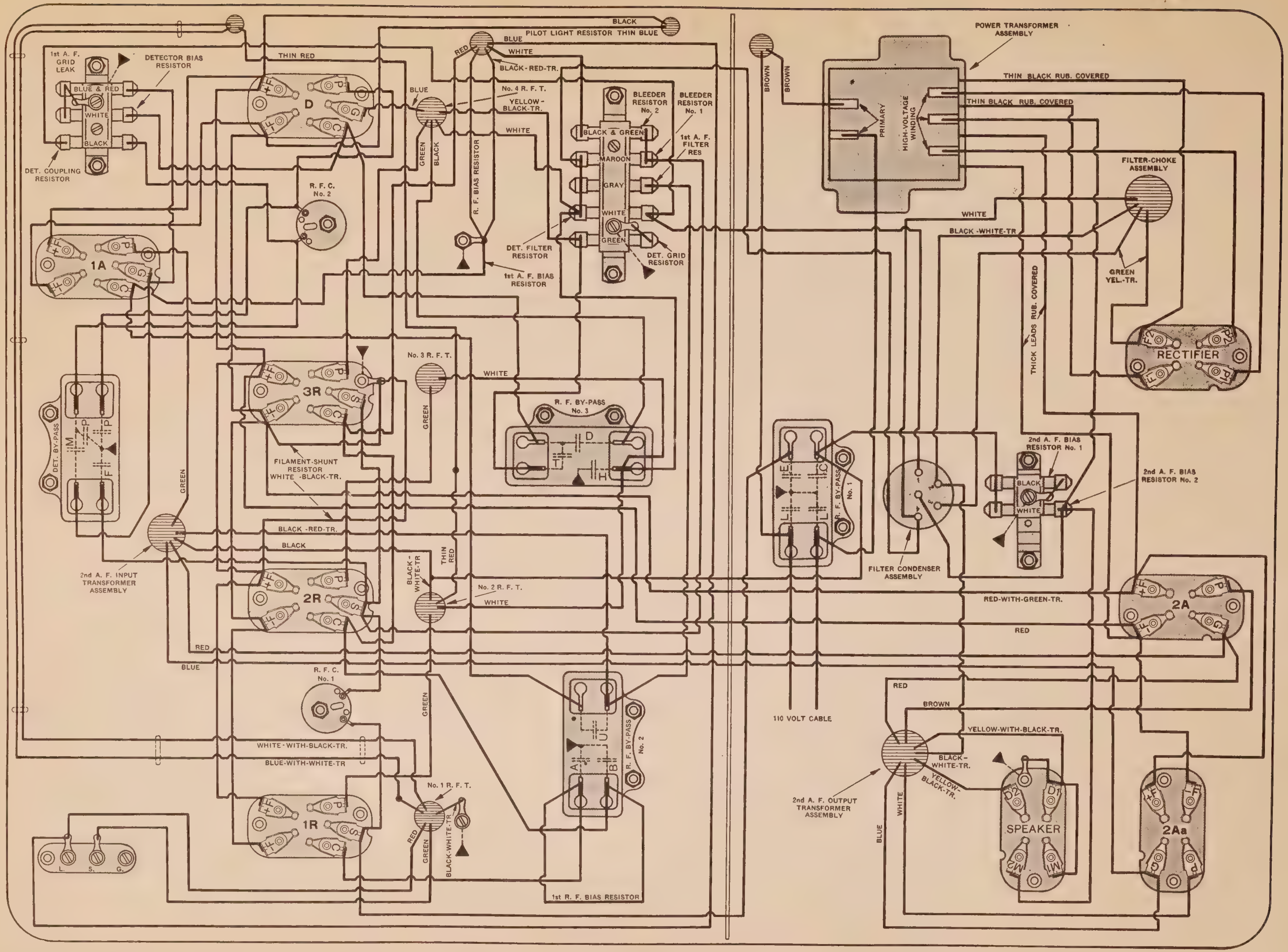

1st A. F. GRID LEAK
DETECTOR BIAS RESISTOR
BLUE & RED
WHITE
BLACK
DET. COUPLING RESISTOR
THIN RED
D
BLUE
RED
WHITE
BLACK-RED-TR.
PILOT LIGHT RESISTOR THIN BLUE
BLACK
No. 4 R. F. T.
YELLOW-BLACK-TR.
WHITE
GREEN
BLACK
R. F. BIAS RESISTOR
DET. FILTER RESISTOR
1st A. F. BIAS RESISTOR
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
1st A. F. FILTER RES
BLACK & GREEN
MAROON
GRAY
WHITE
GREEN
DET. GRID RESISTOR
R. F. C. No. 2
1A
DET. BY-PASS
M
P
F
3R
No. 3 R. F. T.
GREEN
WHITE
R. F. BY-PASS No. 3
D
H
FILAMENT-SHUNT RESISTOR WHITE-BLACK-TR.
2nd A. F. INPUT TRANSFORMER ASSEMBLY
GREEN
BLACK-RED-TR.
BLACK
2R
BLACK-WHITE-TR
THIN RED
No. 2 R. F. T.
WHITE
RED
BLUE
R. F. C. No. 1
GREEN
WHITE-WITH-BLACK-TR.
BLUE-WITH-WHITE-TR
1R
No. 1 R. F. T.
RED
GREEN
BLACK-WHITE-TR
L.
S.
G.
R. F. BY-PASS No. 2
A
B
1st R. F. BIAS RESISTOR
BROWN
BROWN
POWER TRANSFORMER ASSEMBLY
PRIMARY
HIGH-VOLTAGE WINDING
THIN BLACK RUB. COVERED
THIN BLACK RUB. COVERED
WHITE
BLACK-WHITE-TR
THICK LEADS RUB. COVERED
FILTER-CHOKE ASSEMBLY
GREEN
YEL.-TR.
RECTIFIER
F1
F2
P1
P2
R. F. BY-PASS No. 1
E
C
L
FILTER CONDENSER ASSEMBLY
2nd A. F. BIAS RESISTOR No. 1
BLACK
WHITE
2nd A. F. BIAS RESISTOR No. 2
RED-WITH-GREEN-TR.
RED
2A
110 VOLT CABLE
RED
BROWN
YELLOW-WITH-BLACK-TR.
BLACK-WHITE-TR.
YELLOW-BLACK-TR.
2nd A. F. OUTPUT TRANSFORMER ASSEMBLY
BLUE
WHITE
SPEAKER
D1
D2
M1
M2
2Aa
+F
-F
P
G
C
S

FIG. 205. BOTTOM WIRING OF THE 3RD TYPE OF MODEL 60-C (LATER STYLE).

In the 1st style of this model, the R.F. bias resistor, the 1st-R.F. bias resistor and the 1st-A.F. bias resistor are wire-wound on bakelite strips about 3 inches by ⅝ inch. In the 2nd style of this model, these resistors are replaced by "flexible" resistors which resemble ordinary insulated leads, except that each resistor has a die-cast or molded metal lug at each end. The identification of these resistors is as follows:—The R.F. bias resistor, No. 15830, is brown-with-white-diagonal-tracer. The 1st-R.F. bias resistor, No. 15810, is brown-with-white-straight-stripes; it has no chassis-lug. The 1st-A.F. bias resistor, No. 15820 is brown-with-white-straight-stripes; it has one chassis-lug. (Nos. 15810 and 15820 are electrically interchangeable.)

VOLTAGE TABLE FOR 3rd TYPE MODEL 60-C

Set in operation. Volume control at MINIMUM. Test in order listed. (See Page 206.)

Use 1000-ohm-per-volt D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages. Use A. C. Voltmeter to Measure Filament Voltages.

CIRCUIT	MEASURE ACROSS	APPROX. VOLTAGE*		NO READING INDICATES
		110 V. Line	120 V. Line	
FILAMENT	—F to +F on each socket.	2.3	2.4	Open filament winding or connection.
	F1 to F2 on rectifier socket.	4.5	4.7	Open rectifier filament winding.
PLATE	C1R to P1R.	170	185	Open high voltage winding, filter choke, R.F.C. No. 3, 1st-R.F. bias resis., volume control resis. No. 2, R.F. bias resis., or speaker magnet coil.
	C1R to P2R, P3R.	170	185	Open R.F.C. No. 4, or R.F.C. No. 5.
	CD to PD.	119	130	Open detector filter resis., coupling resis., R.F.C. No. 1, or det. bias resis.
	C1A to P1A.	73	80	Open 1st-A.F. filter resis., primary of A.F. input transformer, or 1st-A.F. bias resis.
	—F2A to P2A, P2Aa.	224	250	Open primary of output transformer.
GRID	C1R to G1R (switch at distance).	16.5	18	Open secondary No. 1, R.F.T. or defective L-D sw.
	C2R to G2R, G3R.	16.5	18	Open secondary No. 2, No. 3 R.F.T.
	CD to GD.	1.5	1.8	Open secondary No. 4 R.F.T., or det. grid resis.
	C1A to G1A.	1.9	1.9	Open 1st-A.F. grid leak.
	—F2A to G2A, G2Aa.	36**	40**	Open 2nd-A.F. bias No. 2, or sec. of input trans.
	C1R to G1R (switch at local).	45	50	Open coupling coil, or defective L-D switch.
SCREEN	C1R to S3R, S2R, S1R.	142	155	Open bleeder resis. No. 1, or R.F.C. No. 2.

*These are the measured voltages, not the actual operating voltages. **If 2nd-A.F. bias resis. No. 1 is open, the grid voltage will be approx. 85.

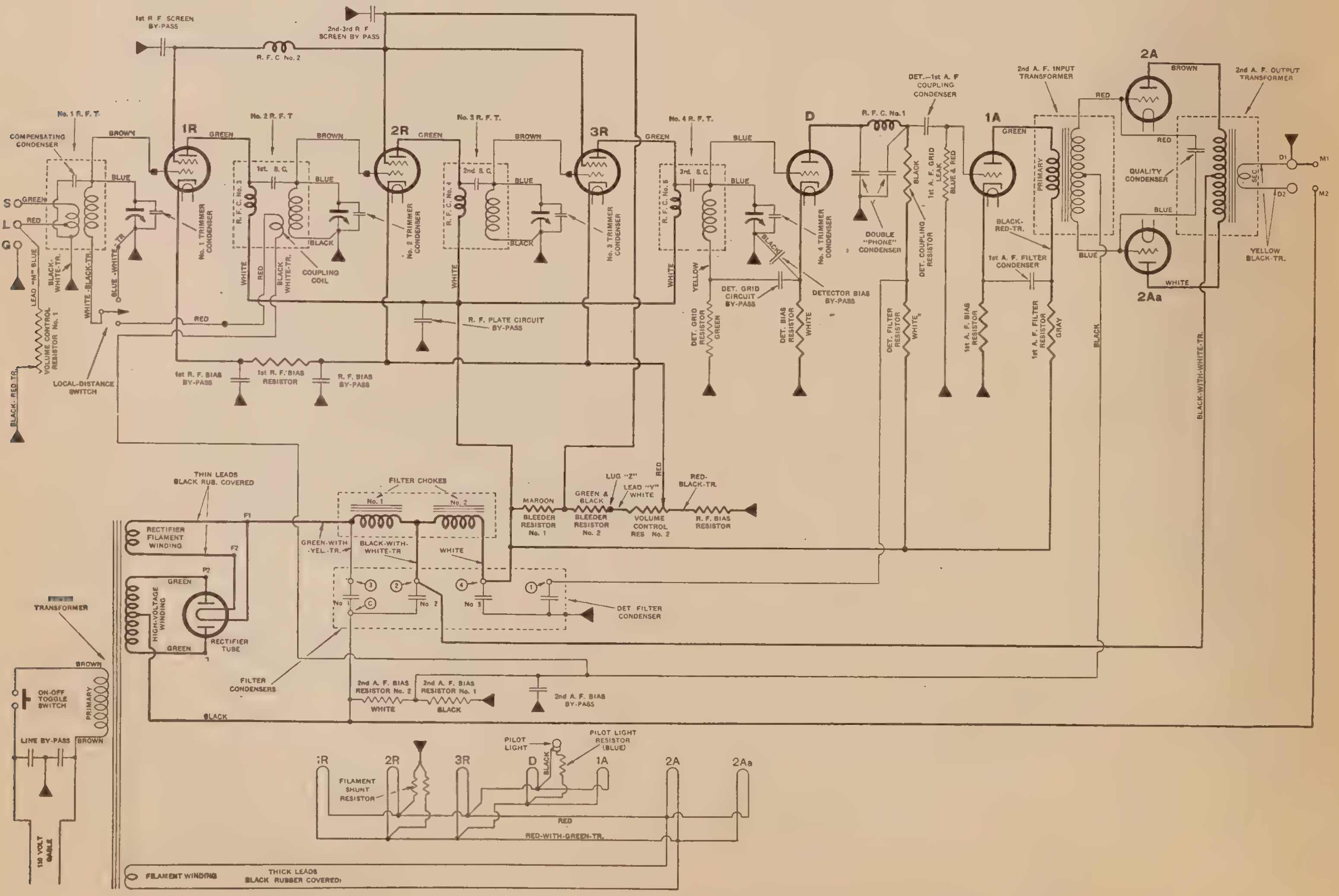

1st R F SCREEN BY-PASS
2nd-3rd R F SCREEN BY PASS
R. F. C No. 2
No. 1 R. F. T.
COMPENSATING CONDENSER
BROWN
1R
GREEN
No. 2 R. F. T
BROWN
2R
GREEN
No. 3 R. F. T.
BROWN
3R
GREEN
No. 4 R. F. T.
BLUE
D
R. F. C. No. 1
DET.—1st A. F COUPLING CONDENSER
1A
GREEN
2nd A. F. INPUT TRANSFORMER
2A
BROWN
2nd A. F. OUTPUT TRANSFORMER
RED
S
GREEN
L
RED
G
BLUE
1st. S. C.
2nd S. C.
3rd. S. C.
R. F. C. No. 3
R. F. C. No. 4
R. F. C. No. 5
BLACK
No. 1 TRIMMER CONDENSER
No. 2 TRIMMER CONDENSER
No. 3 TRIMMER CONDENSER
No. 4 TRIMMER CONDENSER
LEAD "M" BLUE
BLACK-WHITE-TR.
WHITE-BLACK-TR.
BLUE-WHITE-TR.
WHITE
RED
BLACK-WHITE-TR.
COUPLING COIL
YELLOW
DET. GRID CIRCUIT BY-PASS
DETECTOR BIAS BY-PASS
DOUBLE "PHONE" CONDENSER
BLACK
1st A. F. GRID LEAK
BLUE & RED
DET. COUPLING RESISTOR
PRIMARY
BLACK-RED-TR.
1st A. F. FILTER CONDENSER
QUALITY CONDENSER
BLUE
SEC.
D1
D2
M1
M2
YELLOW BLACK-TR.
WHITE
2Aa
VOLUME CONTROL RESISTOR No. 1
LOCAL-DISTANCE SWITCH
BLACK-RED TR.
RED
R. F. PLATE CIRCUIT BY-PASS
1st R. F. BIAS BY-PASS
1st R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
DET. GRID RESISTOR
GREEN
DET. BIAS RESISTOR
WHITE
DET. FILTER RESISTOR
WHITE
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
GRAY
BLACK
BLACK-WITH-WHITE-TR.
THIN LEADS BLACK RUB. COVERED
FILTER CHOKES
No. 1
No. 2
LUG "Z"
LEAD "Y" WHITE
RED
RED-BLACK-TR.
MAROON
BLEEDER RESISTOR No. 1
GREEN & BLACK
BLEEDER RESISTOR No. 2
VOLUME CONTROL RES No. 2
R. F. BIAS RESISTOR
F1
F2
RECTIFIER FILAMENT WINDING
GREEN-WITH-YEL.-TR.
BLACK-WITH-WHITE-TR.
WHITE
P2
GREEN
HIGH-VOLTAGE WINDING
RECTIFIER TUBE
③
②
④
①
Ⓒ
No 1
No 2
No 3
DET FILTER CONDENSER
TRANSFORMER
FILTER CONDENSERS
BROWN
ON-OFF TOGGLE SWITCH
PRIMARY
BLACK
2nd A. F. BIAS RESISTOR No. 2
WHITE
2nd A. F. BIAS RESISTOR No. 1
BLACK
2nd A. F. BIAS BY-PASS
LINE BY-PASS
BROWN
PILOT LIGHT
PILOT LIGHT RESISTOR (BLUE)
1R
2R
3R
D
1A
2A
2Aa
FILAMENT SHUNT RESISTOR
RED
RED-WITH-GREEN-TR.
110 VOLT CABLE
FILAMENT WINDING
THICK LEADS BLACK RUBBER COVERED

FIG. 206. DIAGRAM OF 3RD TYPE OF MODEL 60-C. "S.C." MEANS STOPPING CONDENSER. THIS DIAGRAM IS THE SAME AS FIG. 202.

May, 1930.

CONTINUITY TEST TABLE FOR 3rd TYPE MODEL 60-C

Unsolder leads "M" and "Y." Remove speaker and 110-V. plugs. Set volume control at minimum. Make tests in order listed. (See Page 206.)

	Test	Approx. Correct Reading	Wrong Reading Indicates
Test From F1 To	Contact No. 4 on condenser assembly.	2.2	None—Open No. 1 or 2 filter choke.
	P1R, P2R, P3R.	2.2	None—Open R.F.C. No. 3, 4, or 5.
	S2R, S3R.	1.0	None—Open bleeder resistor No. 1.
	S1R.	1.0	None—Open R.F.C. No. 2.
	Lug "Z."	0.2	None—Open bleeder resistor No. 2.
	PD.	0.1	None—Open detector filter resistor, coupling resistor, or R.F.C. No. 1.
	P1A.	0.4	None—Open 1st-A.F. filter resistor, or primary of A.F. input transformer.
	P2A, P2Aa.	9	None—Open primary of A.F. output transformer.
Test From Chassis To	CD.	0.4	None—Open detector bias resistor.
	C1A.	7.8	None—Open 1st-A.F. bias resistor.
	G2A, G2Aa.	0.2	None—Open secondary of A.F. input trans., or open 2nd-A.F. bias resis. No. 1.
	P1, P2.	0.2	None—Open 2nd-A.F. bias resis. No. 2, or open high-voltage winding.
	F1.	None	Grounded filter chokes, or plate circuits (see page 206).
	Each side of 110-v. plug.	None	Full—Grounded primary circuit of power transformer.
	Each antenna post.	Full	None—Open primary No. 1 R.F.T.
	Lead "M."	1.5	None—Open volume control resis. No. 1. (Vol. control at max. for this test.)
	C2R, C3R.	2.3	None—Open R.F. bias resis., or open volume control resis. No. 2.
	C1R.	2	None—Open 1st-R.F. bias resistor.
	Stator No. 2, 3 V.C.	Full	None—Open secondary No. 2, or 3 R.F.T.
	G1A.	0.2	None—Open 1st-A.F. grid leak.
Other Tests	D1 to D2.	Full	None—Open secondary circuit A.F. output transformer.
	F1 to F2.	Full	None—Open rectifier filament winding.
	Across 110-volt plug.	Full	None—Open primary circuit of power transformer. (Pwr. switch "on.")
	GD to by-pass T.	Full	None—Open secondary No. 4 R.F.T.
	Stator No. 1 variable condenser to chassis.	Full	(with switch at distance) None—Open sec. No. 1 R.F.T. or open switch.
		0.2	(with switch at local) None—Open coupling coil or switch

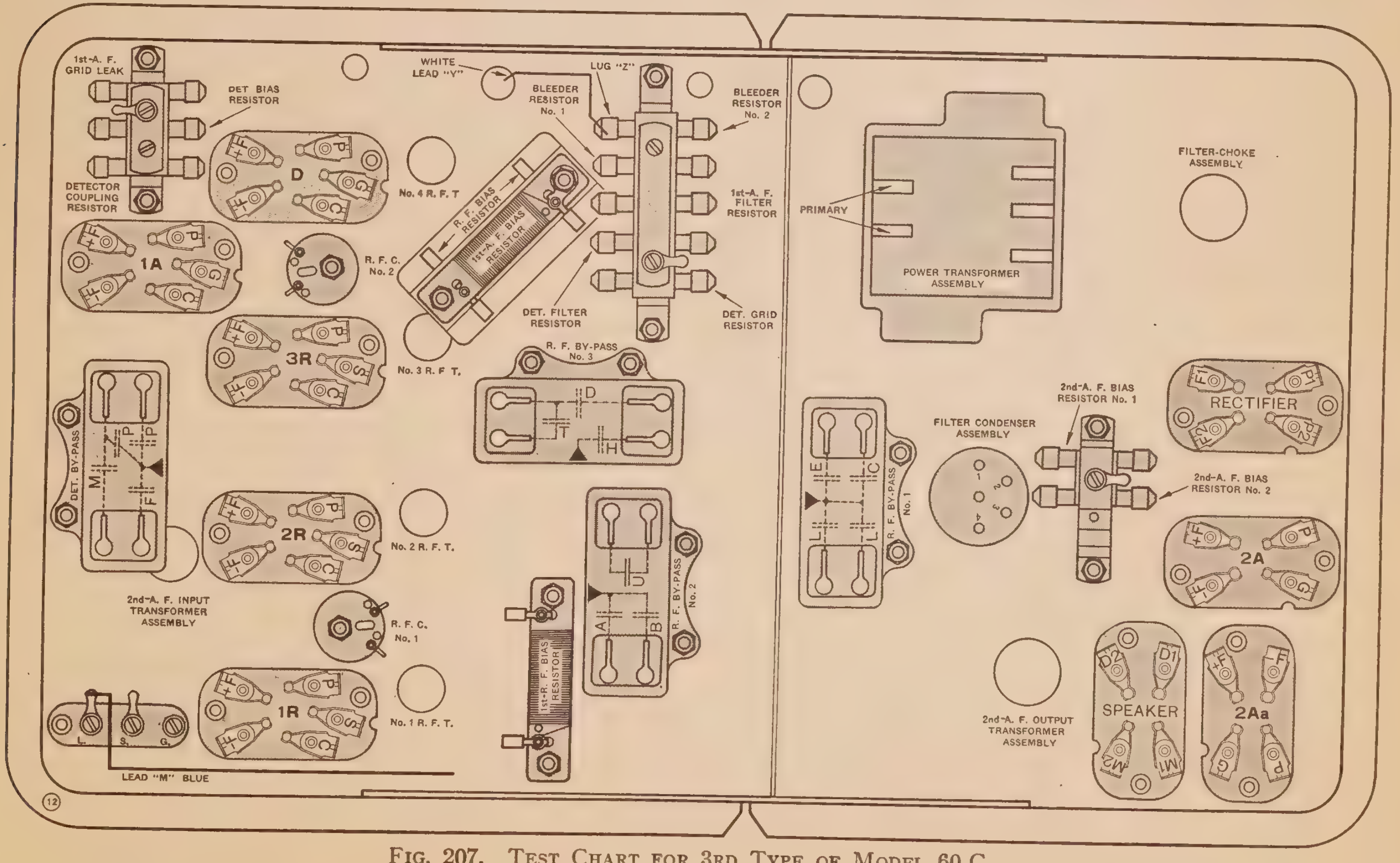

1st-A. F. GRID LEAK
DET BIAS RESISTOR
DETECTOR COUPLING RESISTOR
D
1A
3R
2R
1R
No. 4 R. F. T
No. 3 R. F T.
No. 2 R. F. T.
No. 1 R. F. T.
R. F. C. No. 2
R. F. C. No. 1
WHITE LEAD "Y"
LUG "Z"
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 2
R. F. BIAS RESISTOR
1st-A. F. BIAS RESISTOR
1st-A. F. FILTER RESISTOR
DET. FILTER RESISTOR
DET. GRID RESISTOR
R. F. BY-PASS No. 3
DET. BY-PASS
2nd-A. F. INPUT TRANSFORMER ASSEMBLY
1st-R. F. BIAS RESISTOR
R. F. BY-PASS No. 2
L. S. G.
LEAD "M" BLUE
12
PRIMARY
POWER TRANSFORMER ASSEMBLY
FILTER-CHOKE ASSEMBLY
FILTER CONDENSER ASSEMBLY
R. F. BY-PASS No. 1
2nd-A. F. BIAS RESISTOR No. 1
2nd-A. F. BIAS RESISTOR No. 2
RECTIFIER
2A
2nd-A. F. OUTPUT TRANSFORMER ASSEMBLY
SPEAKER
2Aa

FIG. 207. TEST CHART FOR 3RD TYPE OF MODEL 60-C.

The 1st-R.F. bias resistor, the R.F. bias resistor, and the 1st.-A.F. bias resistor are of a different style in later types of this model. See Page 207.

DESCRIPTION OF THE VARIABLE-CONDENSER UNIT

The condenser group in the 3rd type of Model 60-C consists of four variable condensers and four adjustable "trimmer" condensers. One trimmer condenser is connected in parallel to each variable condenser.

The four stators, or groups of stationary plates, are insulated from each other and from the chassis. A blue lead is soldered to each stator.

The four rotors, or groups of rotary plates, are mounted on a common shaft. Each rotor is held in the correct position on the shaft by two set-screws. *The adjustment of the rotors on the shaft is made at the factory and must not be disturbed under any condition. Also, do not disturb the adjustment of the bearing screw at the rear end of the shaft.*

Four rotor-connection means provide electrical connection to the four rotors. A black lead is soldered to each rotor-connection.

A counter-weight is used to balance the weight of the rotors. The counter-weight does three things:

1. It balances the condenser shaft and thus eliminates any tendency that might otherwise exist for the shaft to turn away from a given dial setting.
2. By its balancing action, the counter-weight makes possible an extremely light and smooth adjustment of the control knob.
3. The counter-weight is limited in its motion by the pilot-light mounting bracket. This limits movement of the shaft between the positions of maximum and minimum capacity value, corresponding respectively to 100 and to zero on the dial.

If the counter-weight should require resetting, proceed as follows:—

1. Loosen the set-screws on the counter-weight.
2. Turn the shaft so the rotors are at maximum, with the straight edge of the rotor plates exactly even with the straight edge of the stator plates.
3. Hold the shaft in this position and turn the counter-weight so that it hits against the right-hand edge of the pilot-light bracket.

   The counter-weight should be about 1-16 inch away from the front edge of the condenser frame so that it will not scrape against the frame.
4. Tighten the counter-weight set-screws.
5. Turn the shaft in order to see that the counter-weight does not touch the frame of the condenser.

The dial and dial gear is arranged with the front side of the scale exactly flush with the front end of the shaft.

When the rotors are set at maximum, with the straight edge of the rotor plates exactly even with the straight edge of the stator plates, the dial should be set exactly at 100 with reference to the indicating point on the escutcheon.

The front and rear bearings of the condenser shaft may be lubricated with "Nujol," and a light film of Nujol may be spread on the rotor-connections.

When handling the set, ALWAYS KEEP THE ROTOR PLATES TURNED INSIDE THE STATOR PLATES in order to prevent accidental bending of the rotor plates.

In order to synchronize the four R. F. circuits accurately at the high-frequency end of the broadcast range (below 10 on the dial) an independently-adjustable trimmer condenser of low value is connected in parallel to each of the four variable condensers.

Each trimmer condenser consists of two plates separated by a piece of mica. The value of each trimmer is regulated by the pressure of a screw which governs the distance between the two plates. The location of these screws is shown in Figure 208.

The adjusting screw on each trimmer condenser is sealed with wax at the factory, but this wax may be easily broken away from the screws when adjustment of the trimmer condensers is necessary.

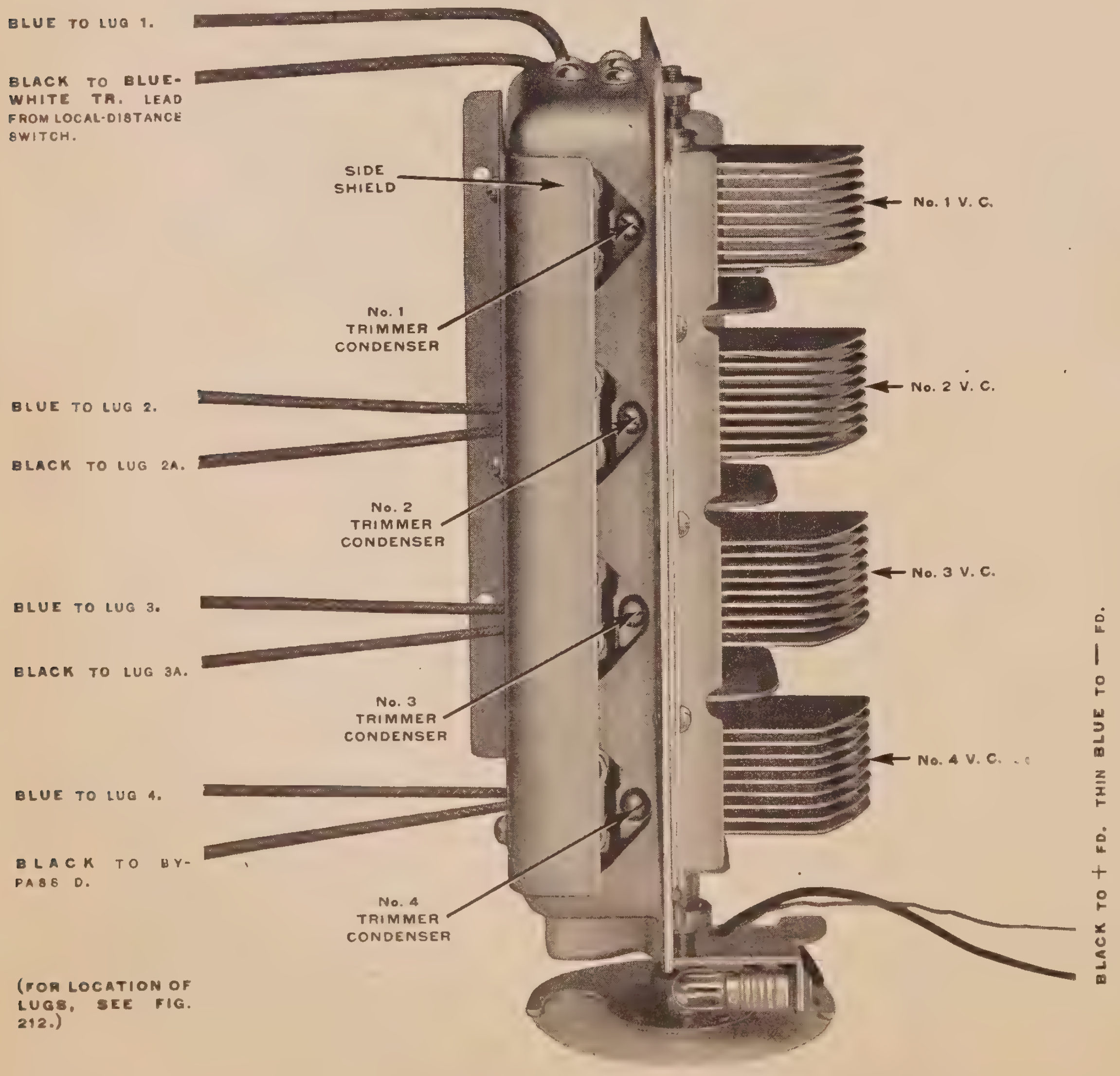


Fig. 208. View of Variable Condenser Unit

Checking Sensitivity of Set

After inspecting, testing, and repairing a set, connect it for operation and measure the plate, grid, screen and filament voltages. If these voltages check satisfactorily, test the receiver on broadcast reception for sensitivity and output volume at different points on the dial.

Lack of sensitivity or volume at certain sections of the tuning dial may be a result of damage to one of the R. F. transformers, or to the variable-condenser unit. Damage to these parts will throw the tuned R. F. circuits out of synchronism.

The initial synchronism of the R. F. circuits is built into the set by rigid uniformity of the R. F. transformers, and by the extremely accurate design of the variable-condenser unit. Owing to the rugged construction of these parts, the built-in factory synchronism should remain constant indefinitely.

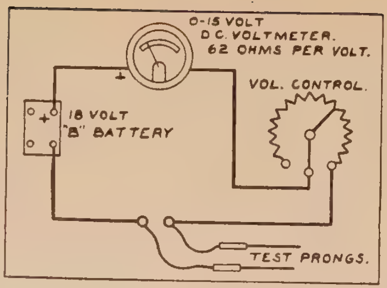


Fig. 209. Diagram of Continuity Testing Circuit.

The voltage control is part No. 13320.

However, if through rough handling the R. F. transformers have been damaged, or the rotor plates of the variable-condenser unit have been bent out of their manufactured alignment, the defective part should be repaired or replaced.

Equipment Required

When checking the sensitivity of the set, it is necessary to use an oscillator, and a meter to indicate maximum output volume.

A local oscillator is necessary to ensure constancy of signal strength; signals from broadcast stations are not sufficiently constant for this work.

An output meter is necessary to ensure a reliable indication of output volume; the ear is not reliable enough for this purpose.

The oscillator feeds a weak signal into the receiver. The signal is amplified in the receiver and produces a reading on a meter which is connected to the output of the set. This meter indicates the strength of output volume. The reading on the output meter is greatest when all the tuned circuits in the set are adjusted to the same frequency as the oscillator signal.

1. *Oscillator.*

The oscillator must provide modulated R. F. signals at four different frequencies in the broadcast range. *These four frequencies should correspond to dial settings of 5, 45, 65 and 95 on the dial of a 3rd type Model 60-C* ***which has the original factory synchronism.***

Each of the four R. F. oscillators should have an adjustable pick-up so that the strength of each oscillator may be controlled independently of the other three.

2. *Output Measuring Circuit.*

The output measuring circuit is shown and described in Figure 210.

Adjusting Trimmer Condensers

1. Connect the common pick-up lead from the four R. F. oscillators to one end of a No. 8112 condenser. Connect the other end of this condenser to the Long-Antenna post. Connect the oscillator container to the Ground post.
2. Put plug "A" of the output measuring circuit in the speaker-plug socket on the set. Plug an F-4 type speaker in socket "B." Throw switch "D" to the right.
3. Put all tubes in the set; power switch on; volume control at maximum; local-distance switch at distance. Break away the sealing wax on the trimmer-condenser screws
4. *Tune set exactly to 5 on dial.* Reduce or increase the amount of pick-up from the 1st oscillator to secure a reading of about 20 on the output meter.
5. With a screw-driver, turn the pressure screw of the 4th trimmer condenser one way or the other, as necessary, to the point where the reading on the output meter is greatest. Repeat this process on the 3rd trimmer, then on the 2nd, and finally on the 1st. Reduce the pick-up from the 1st oscillator if necessary in order to keep the needle of the galvanometer near the centre of its scale.

This adjustment of the trimmer-condenser screws is termed the CORRECT POSITION.

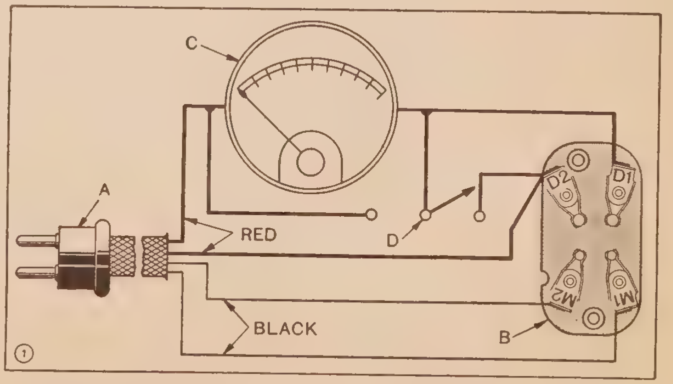
Fig. 210. Output Measuring Circuit for Electro-Dynamic Receivers.

A—Plug-and-cord No. 14537. This is to be inserted in the speaker-plug socket of set that is being tested.

B—Speaker-plug socket No. 17512. Insert plug of correct type of electro-dynamic speaker in this socket.

C—Thermo-coupled galvanometer (115 milliamperes). This meter gives an indication of the amount of A. F. current that is flowing through the voice-coil circuit.

D—Single-pole—double-throw toggle switch No. 13678. With this switch, either the voice coil or the galvanometer may be shorted out of the circuit.



The Connections Shown in Heavy Lines Must Be Short and of Low Resistance.

May, 1930.

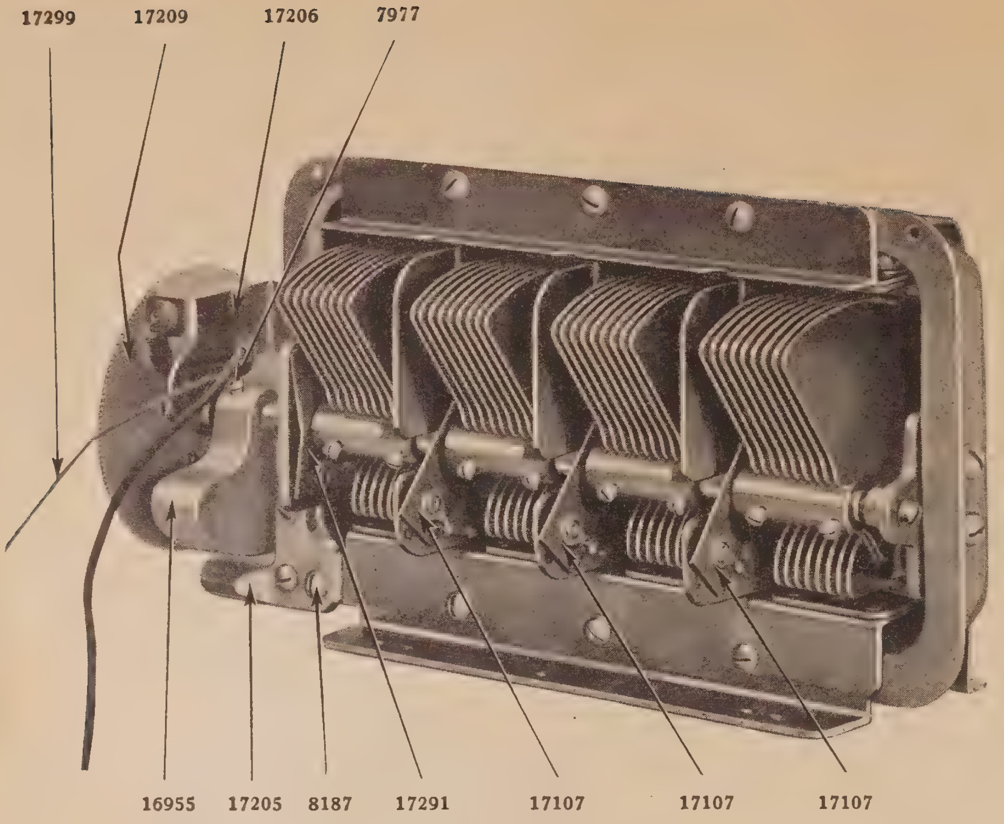

17299
17209
17206
7977
16955
17205
8187
17291
17107
17107
17107

Fig. 211. (Above) View of Variable-Condenser Unit.

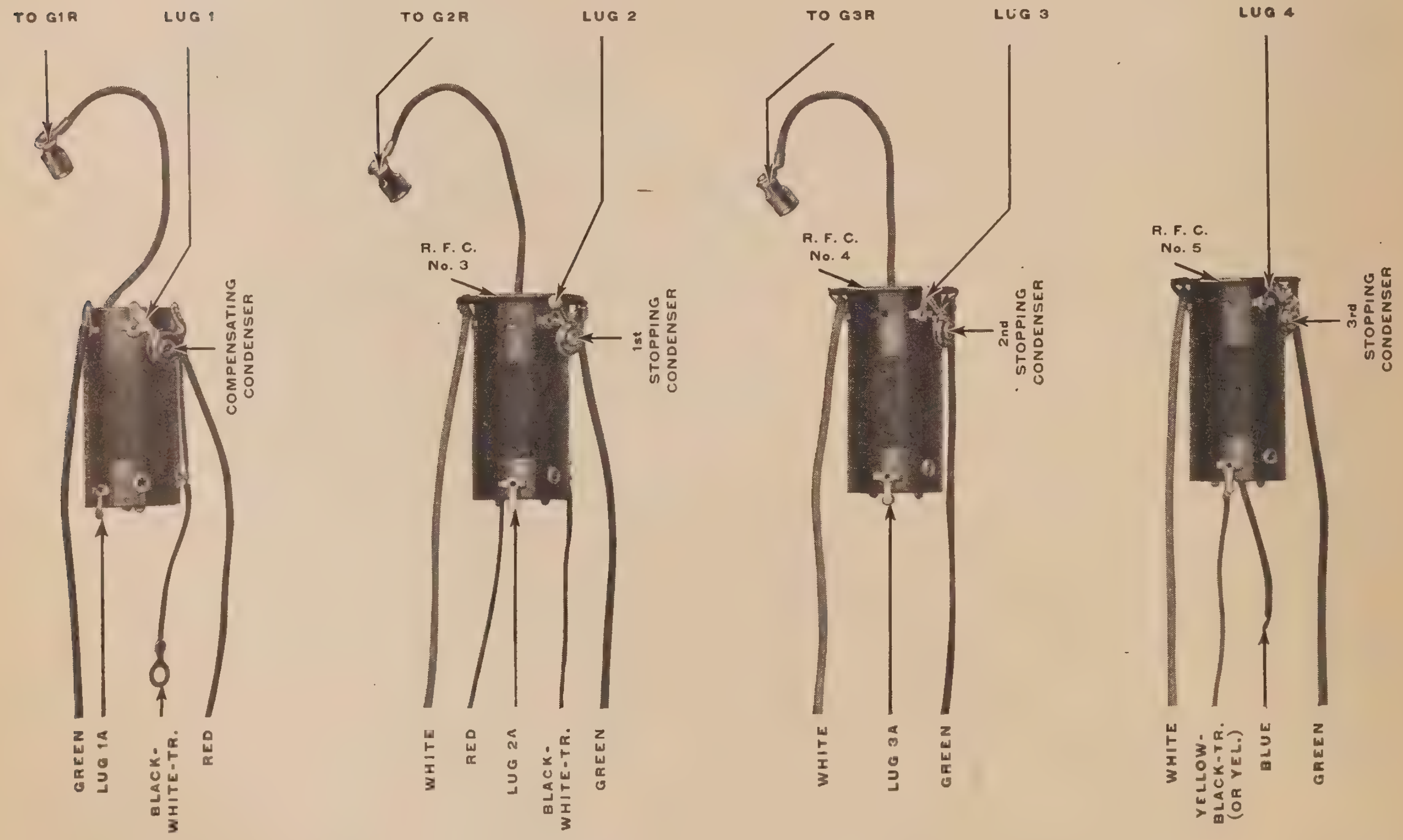
(See Pages 210 and 211 for further information.)

IMPORTANT—Do not disturb the adjustment of the rotor set-screws, nor the bearing-screw at the rear end of the shaft.

If any section of this unit is seriously damaged, the entire unit should be replaced.

Fig. 212. (Below) Coil Group, Showing Location of Parts and Connections of Leads.

If one R. F. coil, or R. F. C. No. 3, No. 4, or No. 5 is defective, the entire coil group must be replaced. If the compensating condenser or one of the stopping condensers is defective, it may be replaced without changing anything else.


TO G1R
LUG 1
COMPENSATING CONDENSER
GREEN
LUG 1A
BLACK-WHITE-TR.
RED
TO G2R
LUG 2
R. F. C. No. 3
1st STOPPING CONDENSER
WHITE
RED
LUG 2A
BLACK-WHITE-TR.
GREEN
TO G3R
LUG 3
R. F. C. No. 4
2nd STOPPING CONDENSER
WHITE
LUG 3A
GREEN
LUG 4
R. F. C. No. 5
3rd STOPPING CONDENSER
WHITE
YELLOW-BLACK-TR. (OR YEL.)
BLUE
GREEN

No. 1 R.F.T.

Brown, with cap, to control-grid of 1R.
Green to S.
Red to L.
Black-white-tr. to chassis.
Connect **white-black tr.** lead from local-distance switch to lug 1A.
Connect **blue** lead from stator No. 1 V.C. to lug 1.
Connect **black** lead from rotor No. 1 V.C. to **blue-white-tr.** lead from local-distance switch.

No. 2 R.F.T.

Brown, with cap, to control-grid of 2R.
Green to P1R.
White to by-pass H.
Black-white-tr. to lead from by-pass C.
Red to lead of same color from local-distance switch.
Connect **blue** lead from stator No. 2 V.C., and **black** lead from rotor No. 2 V.C. to lugs 2 and 2A respectively.

No. 3 R.F.T.

Brown, with cap, to control grid of 3R.
Green to P2R.
White to by-pass H.
Connect **blue** lead from stator No. 3 V.C., and **black** lead from rotor No. 3 V.C. to lugs 3 and 3A respectively.

No. 4 R.F.T.

Blue, short, to GD.
Green to P3R.
White to left-hand end of detector filter resistor.
Yellow or **yellow-black-tr.** to left-hand end of detector grid-circuit resistor.
Connect **blue** lead from stator No. 4 V.C., to lug 4.
Connect **black** lead from rotor No. 4 V.C. to by-pass D.

PARTS AND PRICE LIST

MODEL 60-C, No. 15100, RECEIVING SET (SERIAL No. 5,670,001 to 5,684,000)

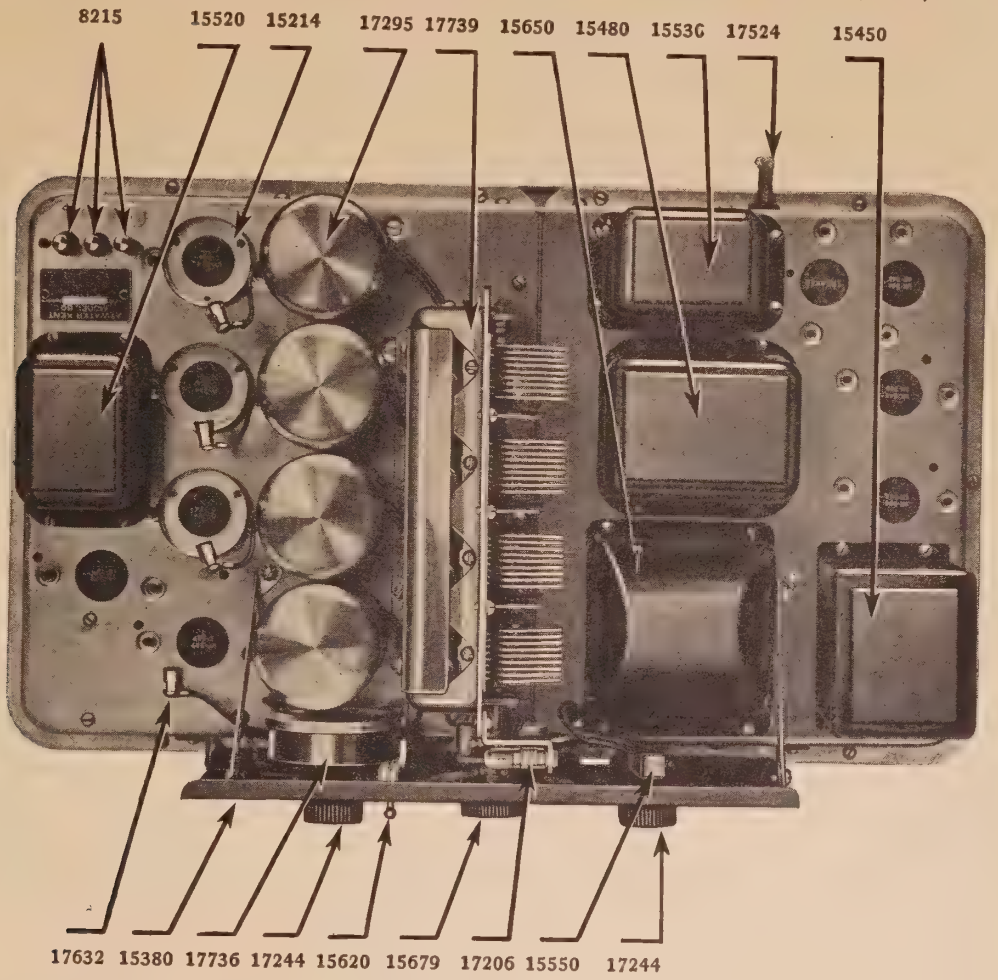


Fig. 213.
Top View.

FRONT PANEL ASSEMBLY

Part No.		Price
15380	Front panel only	$1.50
17224	Front-panel brace (2 used)	.10
17679	Rivets for panel braces	.01
16236	Escutcheon	.50
8272	Rivet for escutcheon	.02
17244	Volume-cont. or on-off switch knob	.30
15562	Set-screw	.50/c
15550	On-off switch complete	1.10
15620	Local-distance switch complete	.90
17736	Volume-control (less bracket)	3.70
17219	Volume-control bracket	.20
16576	Volume-control cover	.05
15679	Dial-knob assembly	.30
15678	Dial knob only	.25
15681	Dial-knob rubber	.02
15682	Dial-knob screw	.06

POWER UNITS

Part No.		Price
15450	Filter-choke assembly	$5.75
15331	Filter-choke lid	.20
15650	Power-transformer assembly	7.50
17268	Power-transformer cover	.50
17563	Power-trans. insulating sheet	.02
15480	Filter-condenser assembly	7.95
17429	Filter-condenser cover	.40
17534	Filter-condenser spacing pad	.25/c
17602	Red lead for filament circuit	.08
17603	Red-green-tracer lead for fil. circuit	.08

AUDIO-FREQUENCY TRANSFORMERS

Part No.		Price
15520	Input A. F. transformer	$3.75
15530	Output A. F. transformer	3.25

Part No.		Price
17739	VARIABLE-CONDENSER ASSEMBLY COMPLETE	$10.95
17738	VARIABLE-CONDENSER STATOR, ROTOR AND FRAME ASSEM. (With leads)	9.25
16955	Balance weight	.35
17209	Dial assembly	.60
17107	Rotor-connection (long)	.10
17291	Rotor-connection (short)	.10
15404	Pilot light	.25
17206	Pilot-light socket	.30
17299	Pilot-light resistor (blue)	.15
17205	Dial-knob bracket	.15

No separate parts, except those listed above, will be supplied for the variable-condenser unit.

COIL GROUP

Part No.		Price
17737	R. F. coil group	$4.00
15540	Stopping condenser (3 used)	.10
15540	Compensating condenser (1 used)	.10
17295	R. F. coil shield (4 used)	.50

If one R. F. coil, or R. F. C. No. 3, No. 4, or No. 5 is defective, the ENTIRE coil group must be replaced.

PARTS AND PRICE LIST (Cont'd)

MODEL 60-C, No. 15100, RECEIVING SET (SERIAL No. 5,670,001 to 5,684,000)

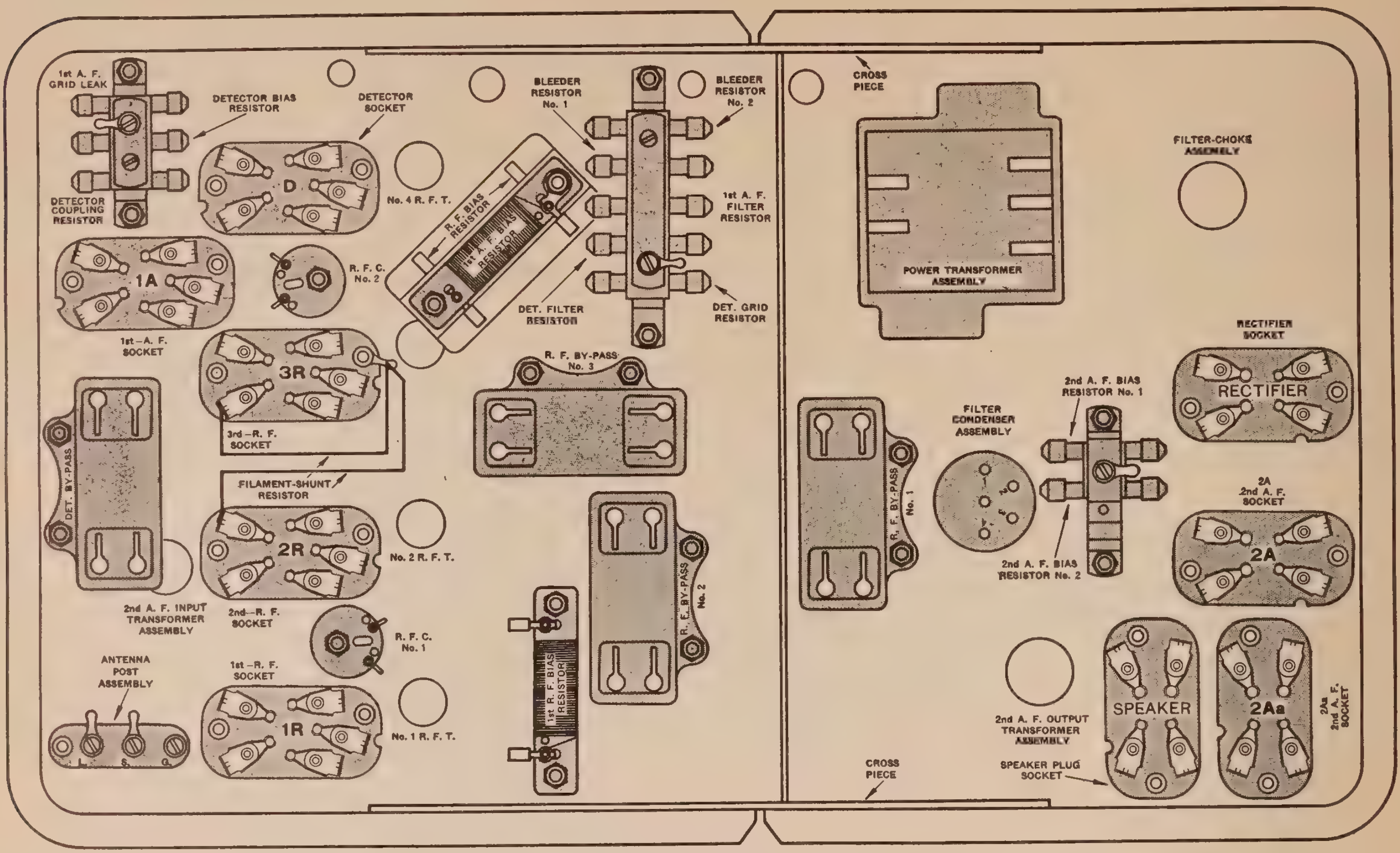

1st A. F. GRID LEAK
DETECTOR BIAS RESISTOR
DETECTOR SOCKET
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 2
CROSS PIECE
FILTER-CHOKE ASSEMBLY
DETECTOR COUPLING RESISTOR
D
No. 4 R. F. T.
R. F. BIAS RESISTOR
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
POWER TRANSFORMER ASSEMBLY
1A
R. F. C. No. 2
DET. FILTER RESISTOR
DET. GRID RESISTOR
1st—A. F. SOCKET
3R
R. F. BY-PASS No. 3
RECTIFIER SOCKET
RECTIFIER
3rd—R. F. SOCKET
FILTER CONDENSER ASSEMBLY
2nd A. F. BIAS RESISTOR No. 1
DET. BY-PASS
FILAMENT-SHUNT RESISTOR
R. F. BY-PASS No. 1
2A 2nd A. F. SOCKET
2R
No. 2 R. F. T.
2A
2nd A. F. BIAS RESISTOR No. 2
R. F. BY-PASS No. 2
2nd A. F. INPUT TRANSFORMER ASSEMBLY
2nd—R. F. SOCKET
R. F. C. No. 1
ANTENNA POST ASSEMBLY
1st—R. F. SOCKET
1R
No. 1 R. F. T.
1st R. F. BIAS RESISTOR
2nd A. F. OUTPUT TRANSFORMER ASSEMBLY
SPEAKER
2Aa
2Aa 2nd A. F. SOCKET
L.
S.
G.
CROSS PIECE
SPEAKER PLUG SOCKET

Fig. 214. Bottom View. (See Page 207.)

TUBULAR RESISTORS
TWO-RESISTOR GROUP

Part No.		*Price*
15592	2nd-A.F. bias res. No. 1 (black)	$ .25
16724	2nd-A.F. bias res. No. 2 (white)	.25
17341	Mounting bracket	.05
17344	Fiber resistor pad	.25/c
17343	Metal clamping strip	.02

THREE-RESISTOR GROUP

Part No.		*Price*
16282	1st-A.F. grid leak (blue, or blue and red)	$ .25
16724	Detector bias resistor (white)	.25
15592	Detector coupling res. (black)	.25
17341	Mounting bracket	.05
17342	Fibre resistor pad	.25/c
17345	Metal clamping strip	.02

FIVE-RESISTOR GROUP

Part No.		*Price*
15545	Bleeder resistor No. 1 (maroon)	$ .25
17558	Bleeder res. No. 2 (black and green)	.25
15285	1st-A.F. filter resistor (gray)	.50
16724	Detector filter resistor (white)	.25
15892	Detector grid resistor (green)	.25
17118	Mounting bracket	.05
17117	Fibre pad	.25/c
17119	Metal clamping strip	.02

WIRE-WOUND RESISTORS

Part No.		*Price*
15720	R. F. bias res. (superseded by No. 15830)	
15670	1st-A.F. bias res. (superseded by No. 15820)	
15660	1st-R.F. bias res. (superseded by No. 15810)	
15830	R. F. bias res.	$ .15
15820	1st-A.F. bias res.	.15
15810	1st-R.F. bias res.	.15
17077	Filament-shunt res. (black-white-tr.)	.15
17299	Pilot-light resistor (blue)	.15
13306	Sheet-fiber insulator 1½" x 3"	.25/c
17232	Sheet-fiber insulator ¾" x 3"	.25/c

15271-A R. F. CHOKE, No. 1, No. 2 (2 used). $ .25

BY-PASS CONDENSERS

Part No.		*Price*
15790	R.F. by-pass No. 1 (H-18)	$1.00
15770	R.F. by-pass No. 2 (H-15)	1.00
15780	R.F. by-pass No. 3 (H-17)	1.10
15640	Detector by-pass (H-16)	1.00

SOCKETS

Part No.		*Price*
17518	R.F. socket (3 used)	$ .30
17519	Detector or 1st-A.F. socket	.30
17511	2Aa socket	.25
17509	2A socket	.25
17508	Rectifier socket	.25
17512	Speaker-plug socket	.25
17377	Socket insulator (fibre-sheet)	.25/c
8249	Socket-fastening eyelet	.50/c

PARTS AND PRICE LIST (Cont'd)

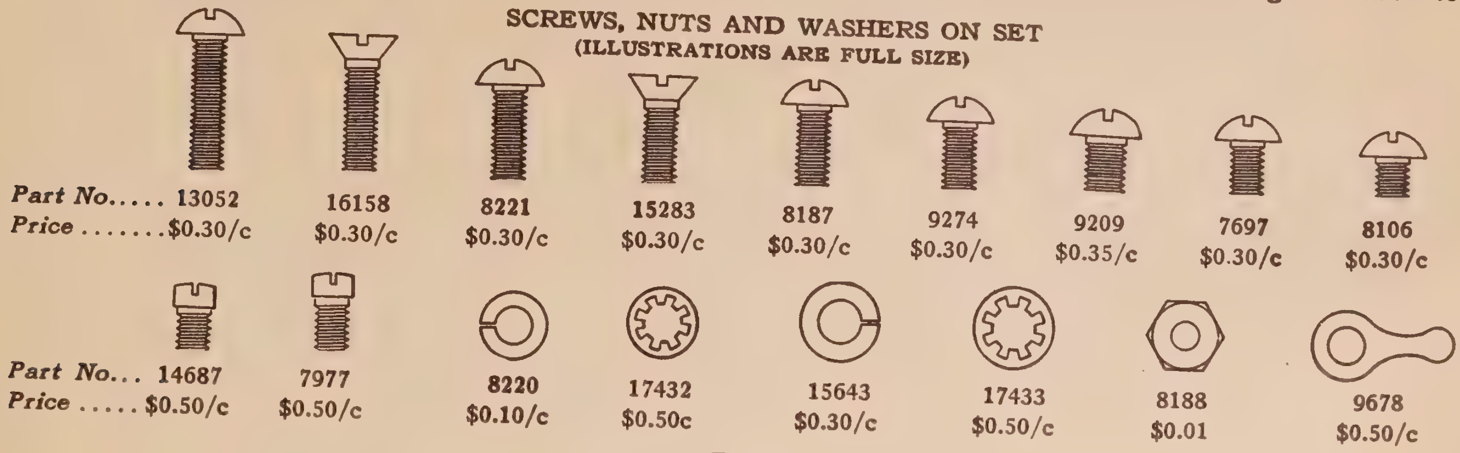
MODEL 60-C, No. 15100, RECEIVING SET (SERIAL No. 5,670,001 to 5,684,000)

MISCELLANEOUS PARTS

Part No.		*Price*
17524	110-volt cable, with plug	$1.90
8956	110-volt plug only	.30
16741	Insul. bushing for 110-volt cable	.05
16742	Bushing-retaining spring	.05
17521	Antenna binding posts and base	.45
8215	Binding post	.20
17536	Bottom plate	1.30
16508	Fibre wire - clamp	.50/c
13989	Ground-clamp assembly	.30

Part No.		*Price*
15213	Tube-shield (3 used)	$0.15
15214	Tube-shield base (3 used)	.03
17326	Detector cap	.30
15410	Literature assembly	.35 net
17332	Instruction book	.10 "
17527	Shipping container	.65 "
17223	Cross piece (10″ x ⅞″—2 used)	.25
17632	Detector-cap lead (brown)	.10
———	Trimmer-condenser sealing wax	.50 lb.

SCREWS, NUTS AND WASHERS ON SET
(ILLUSTRATIONS ARE FULL SIZE)



Part No.	13052	16158	8221	15283	8187	9274	9209	7697	8106
Price	$0.30/c	$0.30/c	$0.30/c	$0.30/c	$0.30/c	$0.30/c	$0.35/c	$0.30/c	$0.30/c

Part No.	14687	7977	8220	17432	15643	17433	8188	9678
Price	$0.50/c	$0.50/c	$0.10/c	$0.50c	$0.30/c	$0.50/c	$0.01	$0.50/c

FIG. 215.

MODEL F-4-C, No. 14410, POWER SPEAKER (AFTER SERIAL No. 6,155,001)

Part No.		*Price*
17547	Cone-housing assembly	$2.60
17546	Terminal-card assembly	.20
7637	Mounting eyelets	.40/c
17392	Name plate	.25
9206	Mounting eyelets	.20/c
17551	Field coil only	8.00
17515	Field-coil insulator	.02
17552	Field-coil spacer	.09
17553	Top pole piece	2.75
17557	Diaphragm assembly	3.25
17556	Cable and plug assembly	1.65
15079	Plug	.65
13499	Cable clamp	.05
14382	Steel ring (3 segments)	1.00
15604	Instruction sheet	.02 net
15578	Shipping container	.35 "
14622	Voice-coil centering gauge (3 used)	.10 set

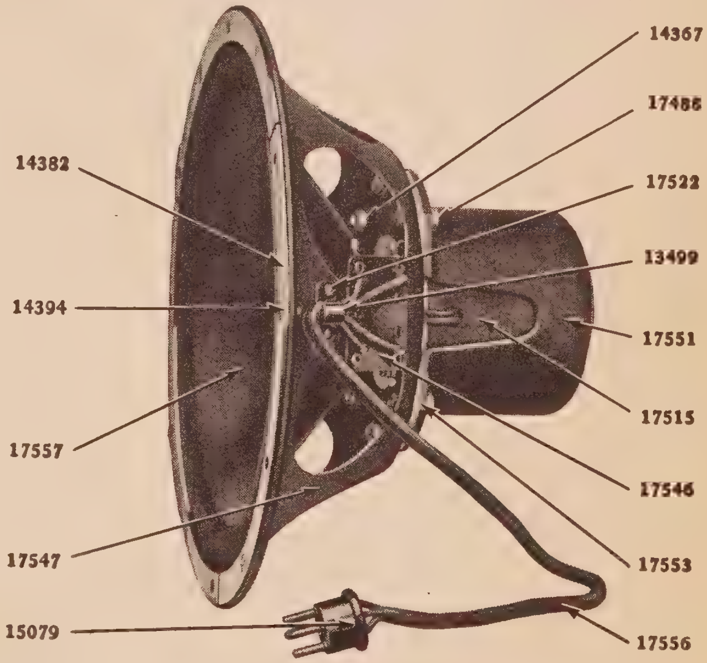
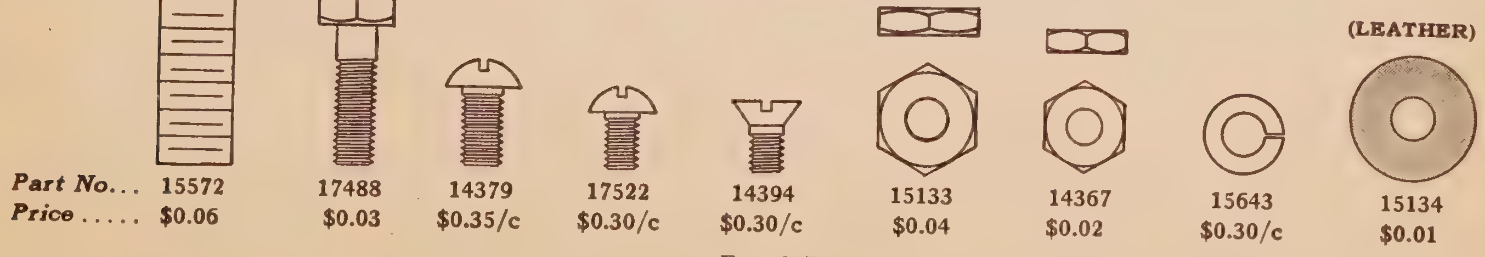


FIG. 216.

SCREWS, NUTS AND WASHERS ON SPEAKER
(ILLUSTRATIONS ARE FULL SIZE)



Part No.	15572	17488	14379	17522	14394	15133	14367	15643	15134
Price	$0.06	$0.03	$0.35/c	$0.30/c	$0.30/c	$0.04	$0.02	$0.30/c	$0.01

FIG. 217.

ATWATER KENT RADIO

Service Data

PARTS LIST AND PRICE LIST FOR

TYPE L, F, P, Q AND D CHASSIS RECEIVERS

AND

TYPE N, N-3, J AND JB SPEAKERS

INDEX OF CONTENTS

GENERAL SERVICE DATA

PAGE
Table of Sets and Speakers 218
Important Service Notes 219
Synchronizing Variable Condensers 219
Variable Condenser Unit 226

PAGE
Coil Group 226
Identification of By-pass Condensers 253
Centering Top Pole Piece 254
Output Measuring Circuit 256

CHASSIS DATA

SUBJECT	TYPE OF CHASSIS							
	L-1	L-2	F	P	Q-1	Q-2	D-1	D-2
	PAGE	PAGE	PAGE	PAGE	PAGE	PAGE	PAGE	PAGE
Top View	227	227	227	227	244	244	251	251
Bottom View	228	228	233	228	245	245	252	252
Schematic Diagram	220	221	230	231	241	241	246	247
Connection of Units	222	224	232	234	242	242	248	248
Bottom Wiring	223	225	233	235	—	243	250	249
Voltage Table	220	221	253	221	241	241	246	246
Parts and Price List	227 228 229	227 228 229	230	231 239	244 245	244 245	251 252 253	251 252 253

PHONOGRAPH DATA

PAGE
Pick-up Circuit and Description 236
Motor Circuit and Description 237
Automatic Switch 237
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Parts and Price List 239
Tabulated Phonograph Data 240

SPEAKER DATA

PAGE
N and N-3 Illustrations 254
N and N-3 Parts and Price List 254
N Circuit 220
J and JB Illustrations 255
J and JB Parts and Price List 255
J Circuit 241

For Screws, Nuts and Small Parts in Sets and Speakers, See Page 229.

December, 1930.

ATWATER KENT RADIO

TABLE OF PRICES, TUBE EQUIPMENT, AND OTHER DATA FOR MODELS 70, 72, 74, 75 AND 76

	Power Source	Price Complete Less Tubes	Type Chassis	Part No.	Type Speaker	Part No.	Color Code	Tubes	Shipping Weight		
									Chassis	Spkr.	Cab.
Model 70 Low-boy 24¾″ wide 15¼″ deep 38¾″ high	60 cycles 110 volts A. C.	$119.	L	16000	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	54 lbs.
	25 cycles 110 volts A. C.	129.	F	16100	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	51¼ lbs.	21¼ lbs.	
	110 volts Direct Current	129	D	16700	N-3	16900	Blue	3-UX-222 2-UX-112A 2-UX-171A	44½ lbs.	22½ lbs.	
	Battery	99.	Q	16800	J	15920	Orange	3-UX-222 2-UX-112A 2-UX-171A	36 lbs.	10¾ lbs.	
Model 72 (Super-Heterodyne) Low High-boy	60 cycles 110 volts A. C.	133.	H	16500	N	16400	Green	3-UY-224 3-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	26½ lbs.
Model 74 Table 24½″ wide 16½″ deep 30¼″ high	60 cycles 110 volts A. C.	125.	L	16000	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	51 lbs.
	25 cycles 110 volts A. C.	135.	F	16100	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	51¼ lbs.	21¼ lbs.	
	110 volts Direct Current	135.	D	16700	N-3	16900	Blue	3-UX-222 2-UX-112A 2-UX-171A	44½ lbs.	22½ lbs.	
Model 75 Phonograph-Combination 26¾″ wide 17″ deep 40¼″ high	60 cycles 110 volts A. C.	195.	P	16600	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	45¾ lbs.	21¼ lbs.	85 lbs.
Model 76 High-boy 26″ wide 16¼″ deep 45¾″ high	60 cycles 110 volts A. C.	145.	L	16000	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	47 lbs.	21¼ lbs.	78½ lbs.
	25 cycles 110 volts A. C.	155.	F	16100	N	16400	Green	3-UY-224 2-UY-227 2-UX-245 1-UX-280	51¼ lbs.	21¼ lbs.	
	110 volts Direct Current	155.	D	16700	N-3	16900	Blue	3-UX-222 2-UX-112A 2-UX-171A	44½ lbs.	22½ lbs.	
	Battery	125.	Q	16800	J	15920	Orange	3-UX-222 2-UX-112A 2-UX-171A	36 lbs.	10¾ lbs.	
Inductor Type Speaker	(Price $28.00)	For use as additional speaker or in multiple-speaker installation.			JB	17010	Black			20¼ lbs.	

December, 1930. These prices are subject to change without notice. WEST COAST PRICES SLIGHTLY HIGHER.

SYNCHRONIZING CONDENSERS

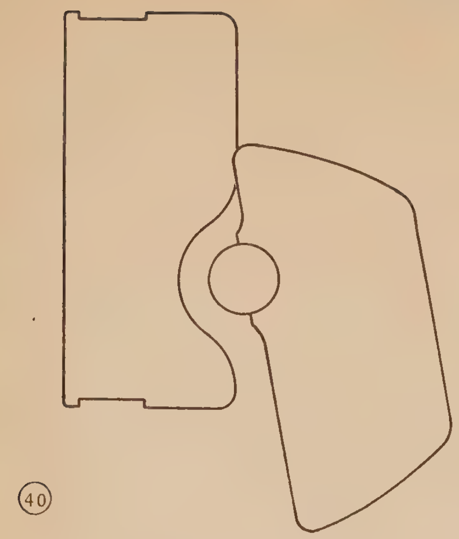


Fig. 218. Position of Rotor Blades for 1500 K. C.

When the variable-condenser unit has been replaced or adjusted in any way, it is necessary to check the alignment as follows:—

(1) Loosen the pointer set-screws.

(2) Move the rotor plates to the position shown in Figure 218.

(3) With the rotor in this position, adjust the pointer to the 1500 K. C. position and tighten the pointer set screws.

(4) Note how far down on the 1500 K. C. mark the pointer comes, then turn the condenser knob to the 550 K. C. mark. The pointer should come down on this mark approximately the same as on the 1500 K. C. mark. If it does not, it is an indication that the front panel is not centered

(5) If the front panel is not centered, loosen the screw at each end of the bottom of the front panel and shift the panel one way or another as necessary. Tighten the panel screws and then reset the pointer accurately.

ADJUSTING TRIMMER CONDENSERS

When adjusting the trimmer condensers, it is necessary to have a four-wave oscillator, providing modulated signals at 1500, 1000, 800 and 600 kilocycles. The oscillator signals should come in at exactly these settings on two or more Type L sets THAT HAVE THE ORIGINAL FACTORY SYNCHRONISM.

1. Connect the common pick-up lead from the four R. F. oscillators to one end of a No. 8112 condenser. Connect the other end of this condenser to the Long-Antenna post. Connect the oscillator container to the Ground post.

2. Connect the output measuring circuit shown in Figure 259 to the speaker-plug socket on the set. Close S2 and S3. Throw S1 to the left.

3. Put all tubes in the set; power switch on; volume control at maximum; local-distance switch at distance. Break away the sealing wax on the trimmer-condenser screws.

4. Turn pointer exactly to the 1500 K. C. mark. Reduce or increase the amount of pick-up from the 1500 K. C. oscillator to secure a reading of about 20 on the output meter.

5. With a screw-driver, turn the pressure screw of the 4th trimmer condenser (on front variable condenser) one way or the other, as necessary, to the point where the reading on the output meter is greatest. Repeat this process on the 3rd trimmer, then on the 2nd, and finally on the 1st. Reduce the pick-up from the 1st oscillator if necessary in order to keep the needle of the galvanometer near the centre of its scale.

This adjustment of the trimmer-condenser screws is termed the CORRECT POSITION.

IMPORTANT SERVICE NOTES

1. In the Types L, F, P, D and Q chassis receivers, it is very important to arrange the three control-grid leads to the screen-grid tubes exactly parallel to each other. If these leads are not parallel, and two of them come close together, the dial readings will not be accurate, especially at the high-frequency end of the scale.

2. When replacing a flexible resistor, care must be taken to use a resistor having the same value. In the event of any uncertainty, make a continuity meter reading of a good resistor of the same type in a stock set, and then use a replacement resistor that gives the same reading on the continuity meter.

3. A number of different code markings may be used to identify by-pass condensers that have the same part number. If the part number is the same, the condensers are interchangeable, even though the code markings are different. (See Page 253.)

TYPE L-1 CHASSIS, VOLTAGE TABLE AND DIAGRAM

VOLTAGE TABLE FOR TYPE L-1 CHASSIS

Set in operation. Volume control at maximum.
L-D Switch at distance.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V LINE

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	2.4	185	6	85
2nd-R.F.	2.35	185	4.5	86
3rd-R.F.	2.35	185	4.5	86
Detector	2.35	120	12**	—
1st-A.F.	2.35	75	3.5	—
2A	2.45	265	55*	—
2Aa	2.45	265	55*	—
Rectifier	5.	—	—	—

* Use 250-volt scale.
** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

In order to identify modifications of each chassis, where such modifications require new part numbers, a numeral is used after the type letter. Thus the 1st style of Type L chassis (below No. 6,234,881) is termed Type L-1, and the 2nd style (above No. 6,234,881) is termed Type L-2. This marking is for use only in Service literature and will not appear on the serial-number plates.

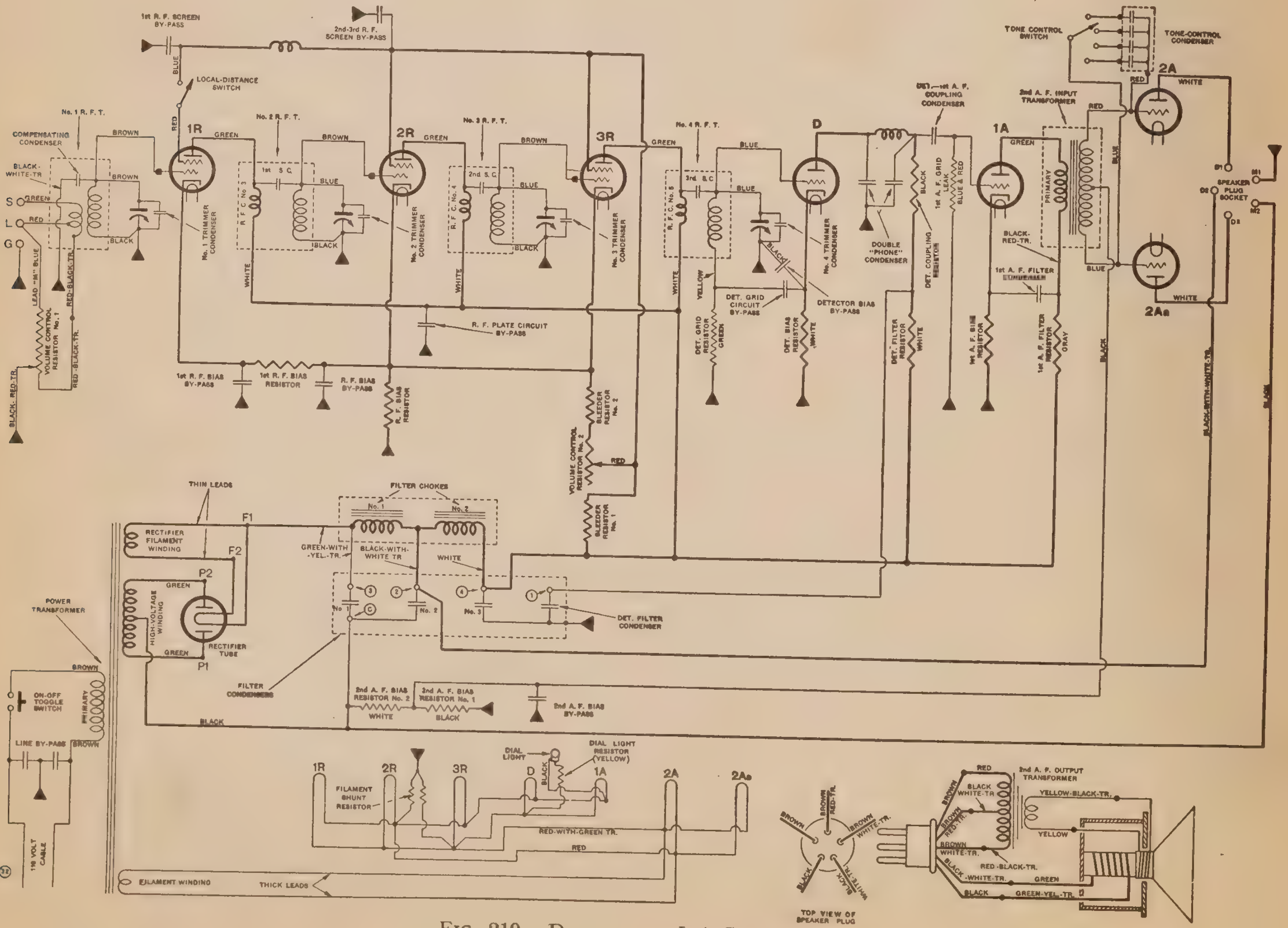

1st R. F. SCREEN BY-PASS
2nd-3rd R. F. SCREEN BY-PASS
BLUE
LOCAL-DISTANCE SWITCH
RED
No. 1 R. F. T.
COMPENSATING CONDENSER
BLACK-WHITE-TR
S
GREEN
L
RED
G
BROWN
BLACK
LEAD "M" BLUE
RED-BLACK-TR.
VOLUME CONTROL RESISTOR No. 1
RED-BLACK-TR.
BLACK-RED-TR.
1R
GREEN
No. 1 TRIMMER CONDENSER
No. 2 R. F. T.
R F C No 3
1st S C
BLUE
WHITE
2R
No. 2 TRIMMER CONDENSER
No. 3 R. F. T.
R F C No. 4
2nd S. C.
3R
No. 3 TRIMMER CONDENSER
R. F. PLATE CIRCUIT BY-PASS
1st R. F. BIAS BY-PASS
1st R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
R. F. BIAS RESISTOR
BLEEDER RESISTOR No. 2
VOLUME CONTROL RESISTOR No. 2
BLEEDER RESISTOR No. 1
No. 4 R. F. T.
R. F. C. No. 5
3rd S C
YELLOW
DET. GRID CIRCUIT BY-PASS
DET. GRID RESISTOR
GREEN
D
No. 4 TRIMMER CONDENSER
DETECTOR BIAS BY-PASS
DET. BIAS RESISTOR
DOUBLE "PHONE" CONDENSER
DET.—1st A. F. COUPLING CONDENSER
DET. COUPLING RESISTOR
1st A. F. GRID LEAK
BLUE & RED
DET. FILTER RESISTOR
1A
BLACK-RED-TR.
1st A. F. FILTER CONDENSER
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
GRAY
2nd A. F. INPUT TRANSFORMER
PRIMARY
TONE CONTROL SWITCH
TONE-CONTROL CONDENSER
2A
2Aa
SPEAKER PLUG SOCKET
D1
M1
D2
M2
BLACK-WITH-WHITE-TR.
THIN LEADS
F1
F2
P2
P1
RECTIFIER FILAMENT WINDING
HIGH-VOLTAGE WINDING
RECTIFIER TUBE
POWER TRANSFORMER
FILTER CHOKES
No. 1
No. 2
GREEN-WITH-YEL.-TR.
BLACK-WITH-WHITE TR
③
②
④
①
Ⓒ
No. 3
DET. FILTER CONDENSER
FILTER CONDENSERS
2nd A. F. BIAS RESISTOR No. 2
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS BY-PASS
ON-OFF TOGGLE SWITCH
PRIMARY
LINE BY-PASS
110 VOLT CABLE
㉜
FILAMENT SHUNT RESISTOR
DIAL LIGHT
DIAL LIGHT RESISTOR (YELLOW)
RED-WITH-GREEN TR.
FILAMENT WINDING
THICK LEADS
TOP VIEW OF SPEAKER PLUG
BROWN-WHITE-TR.
BLACK-WHITE-TR.
BROWN-RED-TR.
2nd A. F. OUTPUT TRANSFORMER
YELLOW-BLACK-TR.
RED-BLACK-TR.
GREEN-YEL.-TR.

Fig. 219. Diagram of L-1 Chassis.

December, 1930.

TYPE L-2 CHASSIS, VOLTAGE TABLE AND DIAGRAM

The Type L Chassis has three stages of screen-grid radio-frequency amplification, plate detection, one stage of resistance-coupled audio, and a "double-audio" output stage. It is designed for 110-120-volt, 50-60-cycle alternating-current operation.

Type F Chassis is similar to Type L, but it is designed for operation on 25-cycle alternating current. The filter circuit is different from the L.

Type P Chassis is similar to Type L, but instead of a "local-distance" switch, it has a "radio-phonograph" switch.

VOLTAGE TABLE FOR TYPE L-2 AND P CHASSIS

Set in operation. Volume control at maximum.
L-D (or 'phono) switch up.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V. LINE

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	2.4	180	5	85
2nd-R.F.	2.35	180	4.5	86
3rd-R.F.	2.35	180	4.5	86
Detector	2.35	110	14**	—
1st-A.F.	2.35	70	2	—
2A	2.45	250	55*	—
2Aa	2.45	250	55*	—
Rectifier	5.	—	—	—

* Use 250-volt scale.
** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

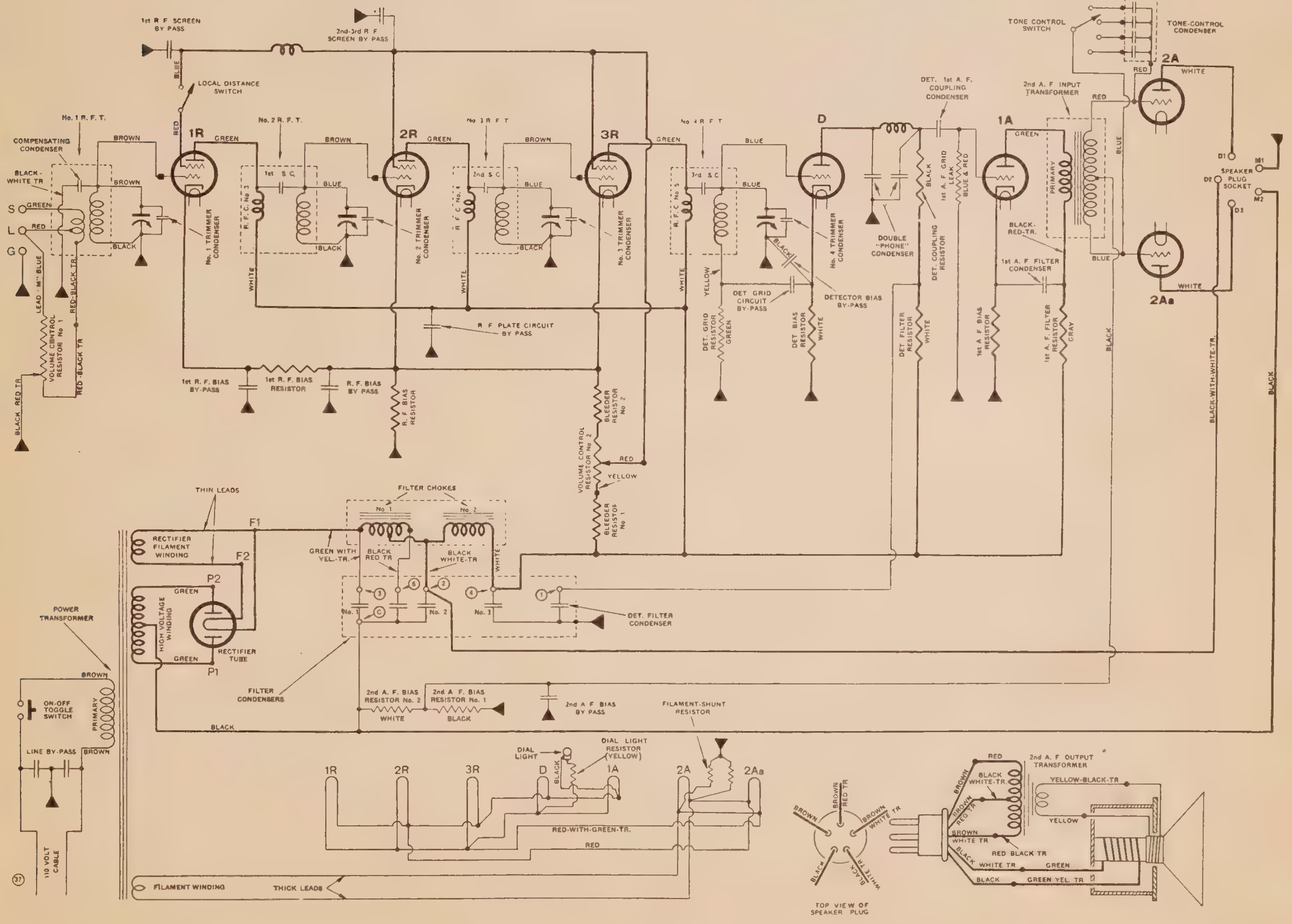

1st R F SCREEN BY PASS
2nd-3rd R F SCREEN BY PASS
BLUE
LOCAL DISTANCE SWITCH
RED
No. 1 R. F. T.
No. 2 R. F. T.
No 3 R F T
No 4 R F T
COMPENSATING CONDENSER
BLACK-WHITE TR
BROWN
GREEN
BLUE
BLACK
WHITE
S
L
G
1R
2R
3R
D
1A
2A
2Aa
1st S. C.
2nd S C
3rd S C
R. F. C. No 3
R F C No. 4
R. F. C No 5
No. 1 TRIMMER CONDENSER
No. 2 TRIMMER CONDENSER
No. 3 TRIMMER CONDENSER
No. 4 TRIMMER CONDENSER
LEAD - "M" BLUE
VOLUME CONTROL RESISTOR No 1
RED-BLACK TR.
BLACK RED TR
R F PLATE CIRCUIT BY PASS
1st R. F. BIAS BY-PASS
1st R. F. BIAS RESISTOR
R. F. BIAS BY PASS
R. F. BIAS RESISTOR
BLEEDER RESISTOR No 2
VOLUME CONTROL RESISTOR No 2
RED
YELLOW
BLEEDER RESISTOR No 1
DET. 1st A. F. COUPLING CONDENSER
2nd A. F INPUT TRANSFORMER
TONE CONTROL SWITCH
TONE-CONTROL CONDENSER
DOUBLE "PHONE" CONDENSER
DET GRID CIRCUIT BY-PASS
DETECTOR BIAS BY-PASS
DET. GRID RESISTOR
DET. BIAS RESISTOR
DET. FILTER RESISTOR
DET. COUPLING RESISTOR
1st A. F GRID LEAK
BLUE & RED
1st A F BIAS RESISTOR
1st A. F FILTER CONDENSER
1st A. F. FILTER RESISTOR
GRAY
PRIMARY
BLACK-RED-TR.
SPEAKER PLUG SOCKET
D1
D2
D3
M1
M2
BLACK-WITH-WHITE-TR.
THIN LEADS
FILTER CHOKES
No 1
No 2
F1
F2
P1
P2
RECTIFIER FILAMENT WINDING
HIGH VOLTAGE WINDING
RECTIFIER TUBE
GREEN WITH YEL.-TR.
BLACK RED TR
BLACK WHITE-TR
No. 1
No. 2
No. 3
DET. FILTER CONDENSER
POWER TRANSFORMER
FILTER CONDENSERS
2nd A. F. BIAS RESISTOR No. 2
2nd A F. BIAS RESISTOR No. 1
2nd A F BIAS BY PASS
FILAMENT-SHUNT RESISTOR
ON-OFF TOGGLE SWITCH
PRIMARY
LINE BY-PASS
110 VOLT CABLE
37
DIAL LIGHT
DIAL LIGHT RESISTOR (YELLOW)
RED-WITH-GREEN-TR.
FILAMENT WINDING
THICK LEADS
TOP VIEW OF SPEAKER PLUG
BROWN
BROWN RED TR
BROWN WHITE TR
BLACK WHITE TR
2nd A. F OUTPUT TRANSFORMER
BLACK WHITE-TR.
YELLOW-BLACK-TR
BROWN WHITE TR
RED BLACK TR
GREEN YEL. TR

FIG. 220. DIAGRAM OF L-2 CHASSIS.

In the majority of L-2 sets, the filament shunt resistor is connected across the R.F. filaments, as shown in Fig. 219. Also, a 2-ampere fuse is connected in one side of the 110-volt line.

TYPE L-1 CHASSIS RECEIVER

Condensers in R.F. By-Pass No. 1

L—Line by-pass.
L—Line by-pass.
C—2nd-A.F. bias by-pass.
E—1st-R.F. screen by-pass.

Condensers in R.F. By-Pass No. 2

A—1st-R.F. bias by-pass.
B—R.F. bias by-pass.
U—1st-A.F. filter condenser.

Condensers in R.F. By-Pass No. 3

D—Detector bias by-pass.
H—R.F. plate-circuit by-pass.
T—Detector grid-circuit by-pass.

Condensers in Detector By-Pass

F—2nd-3rd R.F. screen by-pass.
M—Detector-1st A.F. coupling condenser.
P—Phone condenser.
P—Phone condenser.

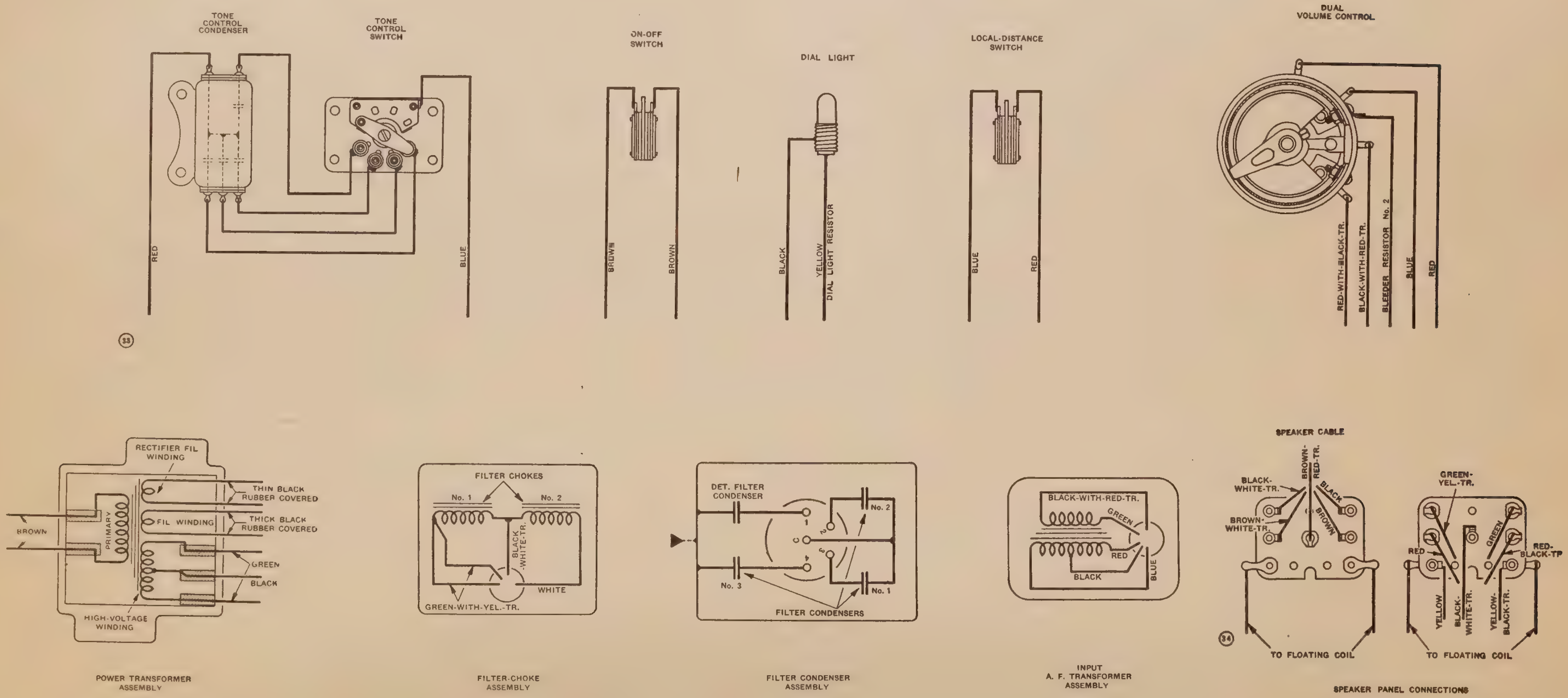

TONE CONTROL CONDENSER
TONE CONTROL SWITCH
ON-OFF SWITCH
DIAL LIGHT
LOCAL-DISTANCE SWITCH
DUAL VOLUME CONTROL
RED
BLUE
BROWN
BROWN
BLACK
YELLOW
DIAL LIGHT RESISTOR
BLUE
RED
RED-WITH-BLACK-TR.
BLACK-WITH-RED-TR.
BLEEDER RESISTOR No. 2
BLUE
RED
(33)
RECTIFIER FIL WINDING
THIN BLACK RUBBER COVERED
FIL WINDING
THICK BLACK RUBBER COVERED
BROWN
PRIMARY
GREEN
BLACK
HIGH-VOLTAGE WINDING
POWER TRANSFORMER ASSEMBLY
FILTER CHOKES
No. 1
No. 2
BLACK-WHITE-TR.
WHITE
GREEN-WITH-YEL.-TR.
FILTER-CHOKE ASSEMBLY
DET. FILTER CONDENSER
No. 2
No. 3
No. 1
1
2
3
FILTER CONDENSERS
FILTER CONDENSER ASSEMBLY
BLACK-WITH-RED-TR.
GREEN
RED
BLACK
BLUE
INPUT A. F. TRANSFORMER ASSEMBLY
SPEAKER CABLE
BLACK-WHITE-TR.
BROWN-RED-TR.
BLACK
BROWN
BROWN-WHITE-TR.
GREEN-YEL.-TR.
GREEN
RED
RED-BLACK-TR.
YELLOW
BLACK-WHITE-TR.
YELLOW-BLACK-TR.
(34)
TO FLOATING COIL
TO FLOATING COIL
SPEAKER PANEL CONNECTIONS

FIG. 221. CONNECTION OF UNITS IN TYPE L-1 CHASSIS, AND, AT RIGHT, CONNECTIONS TO TERMINAL PANEL OF TYPE N SPEAKER.

The rectifier filament winding leads come out the left-hand side of the power transformer; these are thin leads covered with black sleeving. The filament winding has thick leads covered with black sleeving.

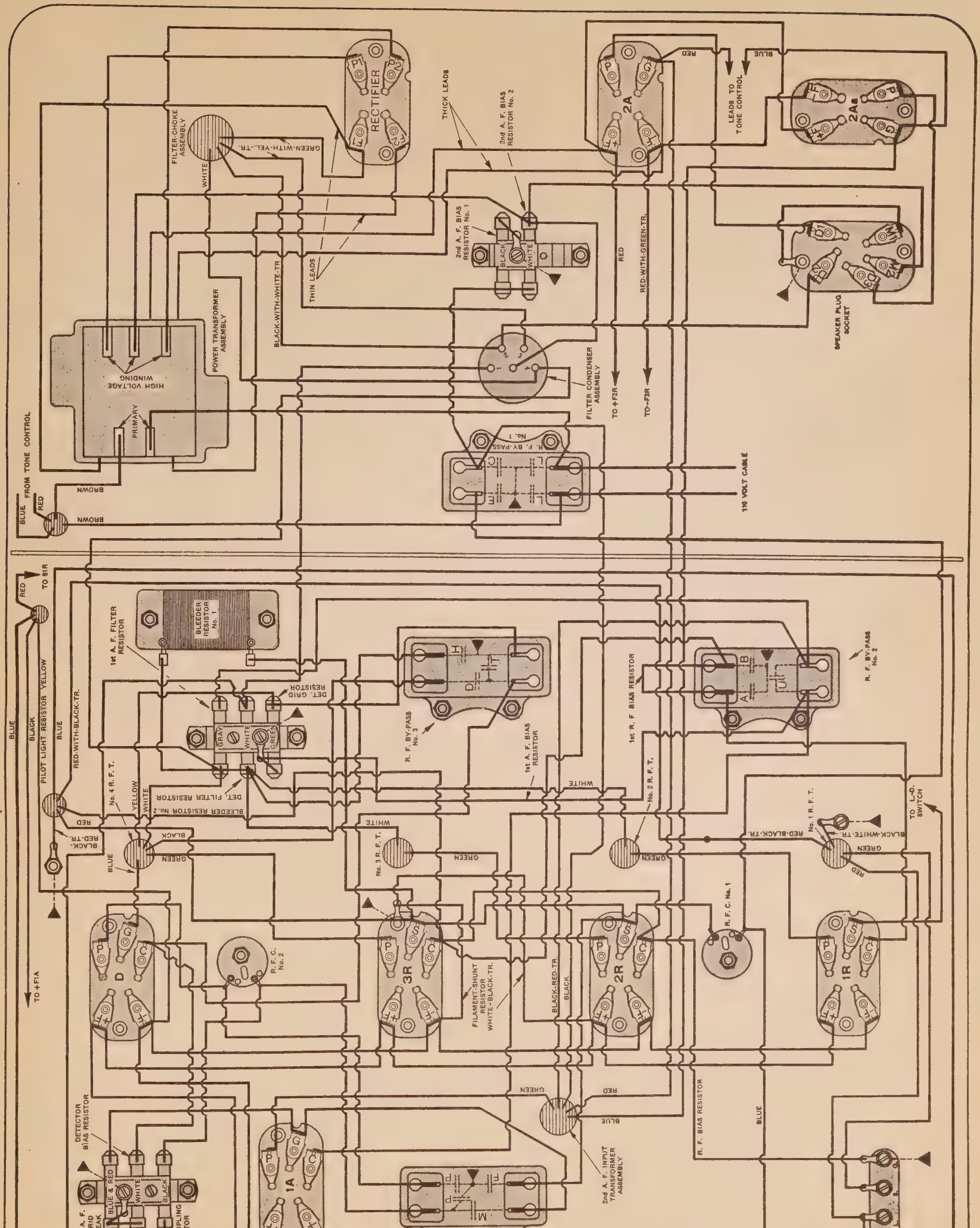

RECTIFIER
P1
P2
F1
F2
FILTER-CHOKE ASSEMBLY
WHITE
GREEN-WITH-YEL.-TR.
THICK LEADS
THIN LEADS
2nd A. F. BIAS RESISTOR No. 2
2nd A. F. BIAS RESISTOR No. 1
BLACK
WHITE
BLACK-WITH-WHITE-TR
HIGH VOLTAGE WINDING
POWER TRANSFORMER ASSEMBLY
PRIMARY
FROM TONE CONTROL
BLUE
RED
BROWN
FILTER CONDENSER ASSEMBLY
R. F. BY-PASS No. 1
110 VOLT CABLE
TO +F2R
TO -F3R
RED
RED-WITH-GREEN-TR.
2A
2As
LEADS TO TONE CONTROL
SPEAKER PLUG SOCKET
TO S1R
YELLOW
BLACK
PILOT LIGHT RESISTOR
RED-WITH-BLACK-TR.
BLEEDER RESISTOR No. 1
1st A. F. FILTER RESISTOR
DET. GRID RESISTOR
GRAY
GREEN
DET. FILTER RESISTOR
BLEEDER RESISTOR No. 2
No. 4 R. F. T.
BLACK-RED-TR.
R. F. BY-PASS No. 3
1st A. F. BIAS RESISTOR
1st R. F. BIAS RESISTOR
R. F. BY-PASS No. 2
No. 3 R. F. T.
No. 2 R. F. T.
No. 1 R. F. T.
RED-BLACK-TR.
BLACK-WHITE-TR.
TO L-D. SWITCH
TO +F1A
D
R. F. C. No. 2
3R
FILAMENT-SHUNT RESISTOR WHITE-BLACK-TR.
BLACK-RED-TR.
2R
R. F. C. No. 1
1R
DETECTOR BIAS RESISTOR
BLUE & RED
1st A. F. GRID LEAK
DET. COUPLING RESISTOR
1A
DET. BY-PASS
2nd A. F. INPUT TRANSFORMER ASSEMBLY
R. F. BIAS RESISTOR
18

Fig. 222. Bottom Wiring of Type L-1 Chassis.

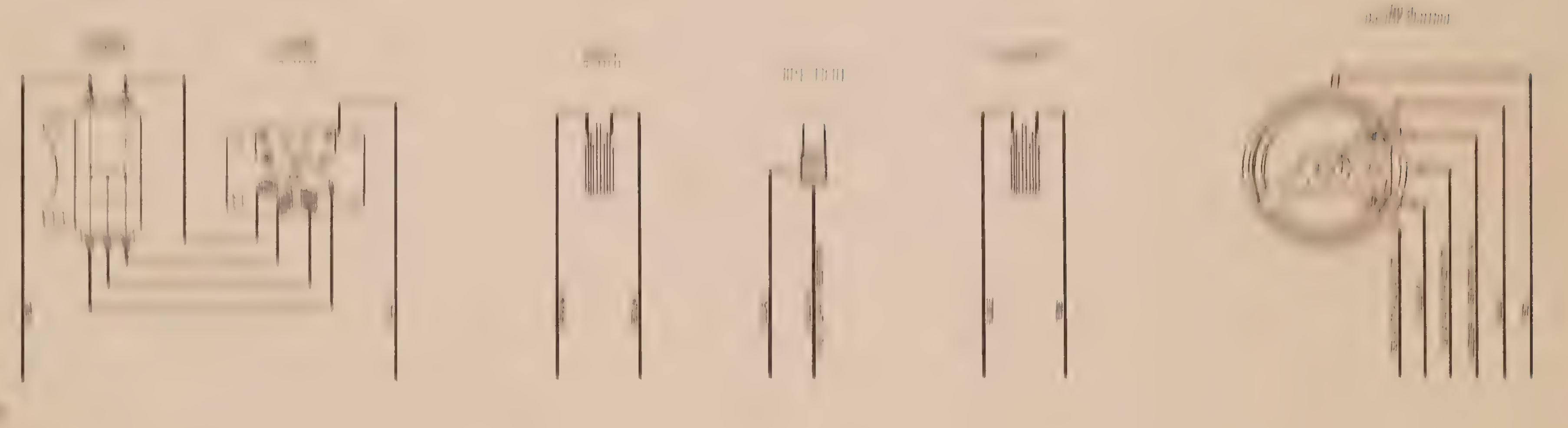
TYPE L-7 CHASSIS RECEIVER

Condensers in B.F. By-Pass No. 1
[illegible] by-pass
[illegible] by-pass
[illegible] A.F. [illegible] by-pass
[illegible] R.F. screen by-pass

Condensers in B.F. By-Pass No. 2
A—1st R.F. plate by-pass
B—R.F. plate by-pass
C—1st A.F. filter condenser

Condensers in B.F. By-Pass No. 3
D—Detector plate by-pass
E—R.F. plate circuit by-pass
F—[illegible] grid [illegible] by-pass

Condensers in [illegible] By-Pass
G—2nd and 3rd R.F. screen by-pass
H—Detector 1st A.F. coupling condenser
I—Phone condenser
J—Phone condenser



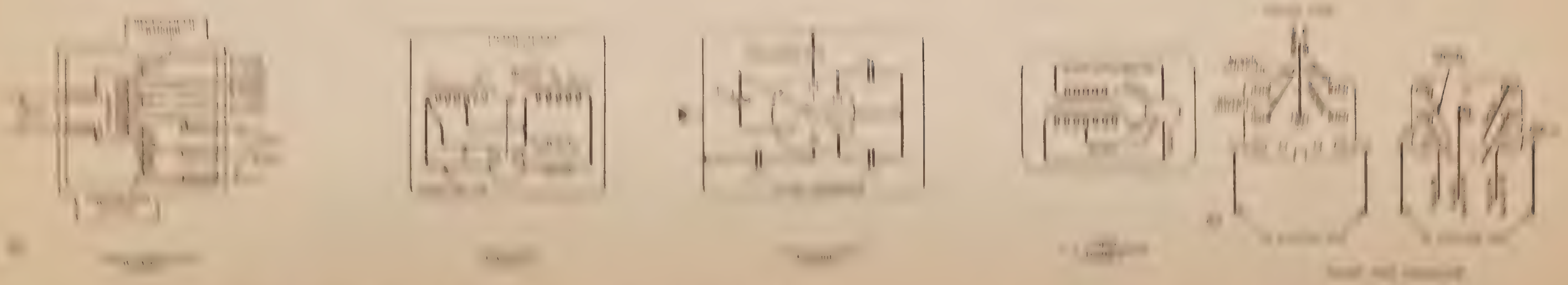


Fig. [illegible]. [illegible]

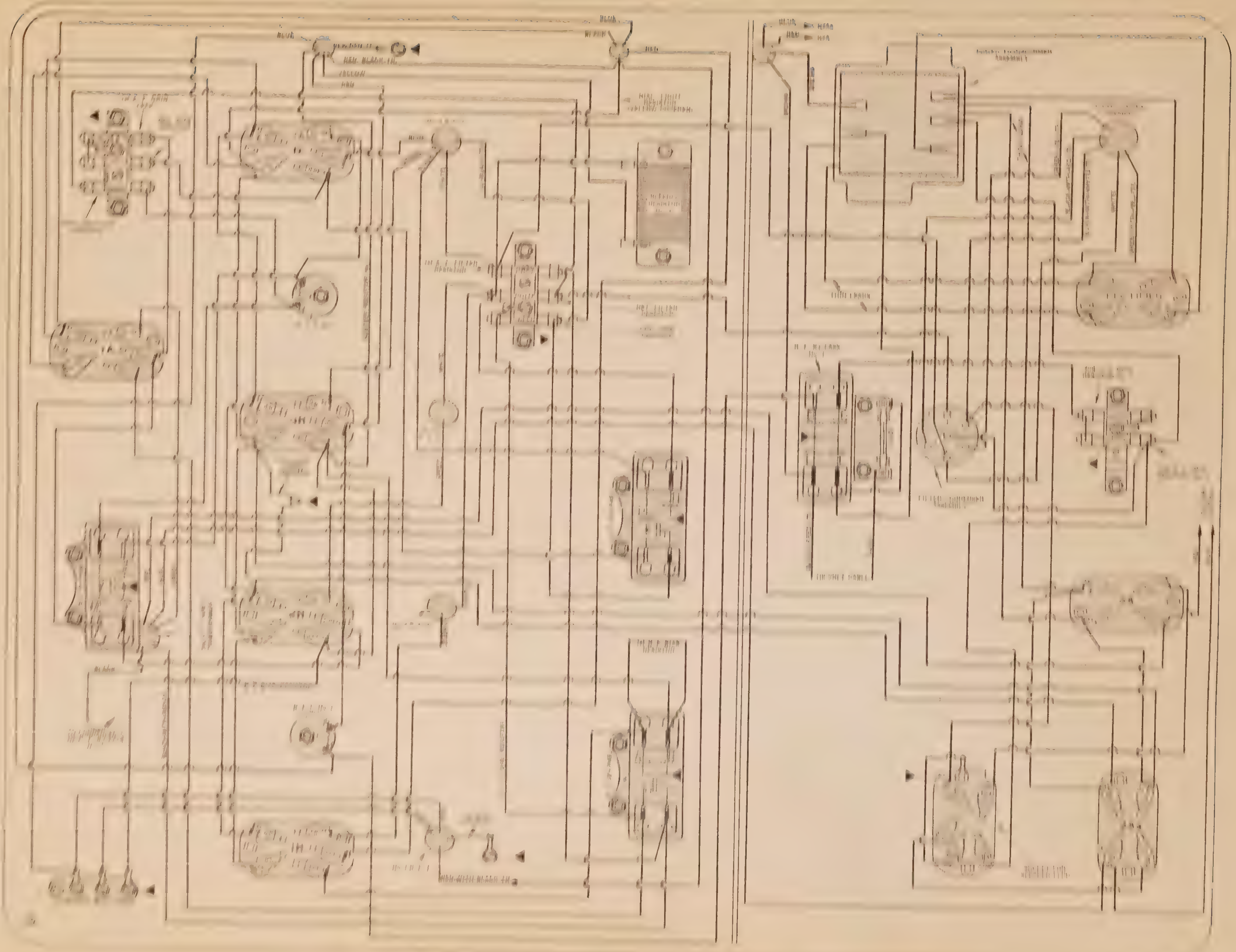
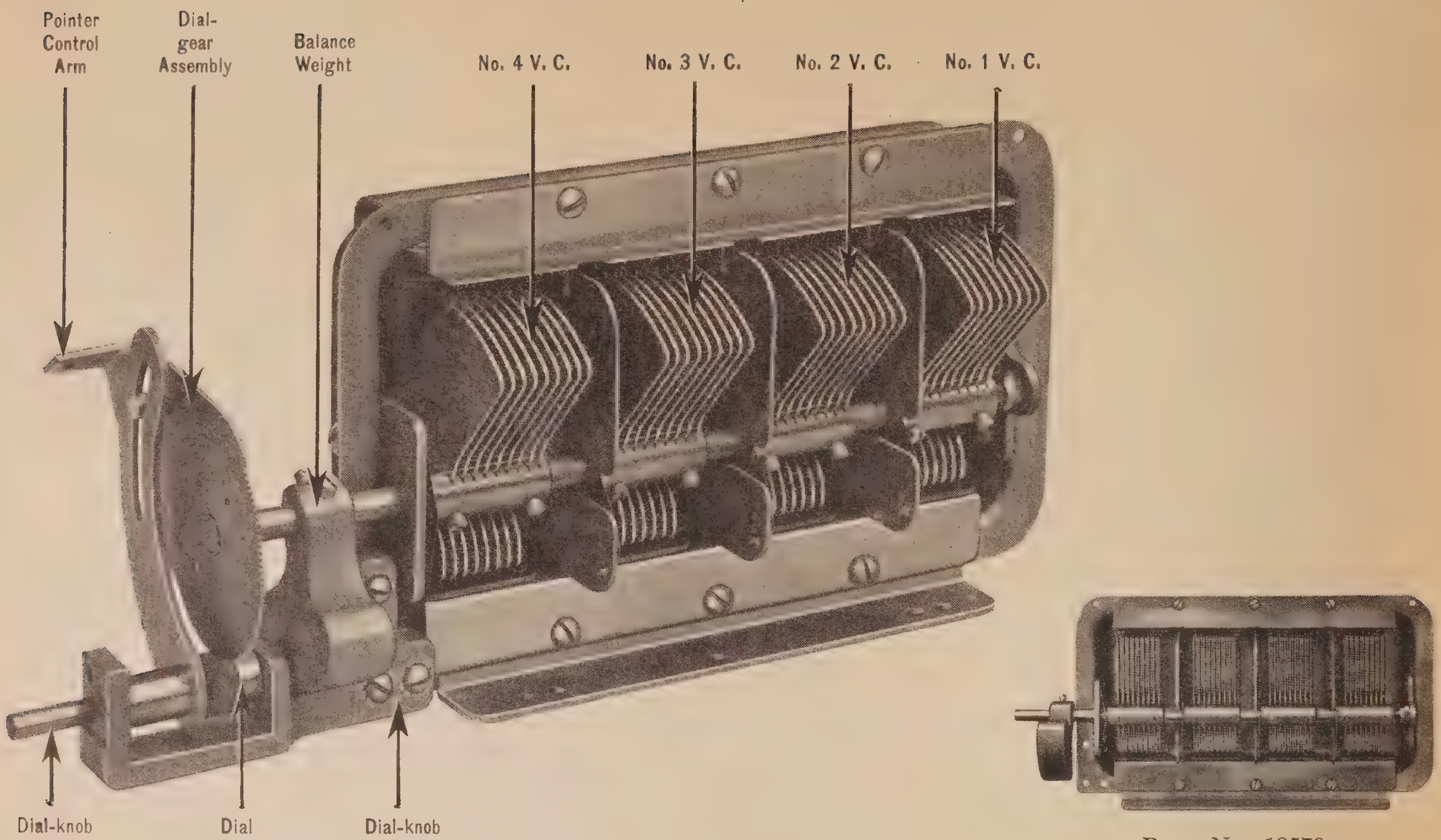

BLUE
RED
YELLOW
RED BLACK TR.
HEAD
DIAL LIGHT

FIG. 234 — BOTTOM WIRING OF TYPE L-9 CHASSIS RECEIVER

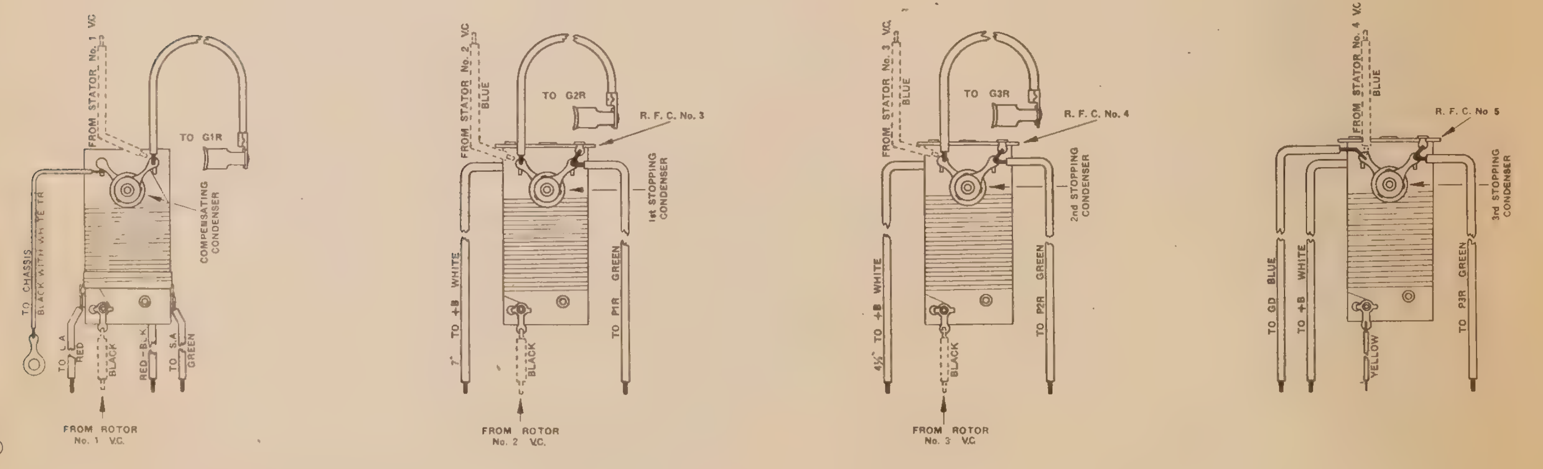

Pointer Control Arm
Dial-gear Assembly
Balance Weight
No. 4 V. C.
No. 3 V. C.
No. 2 V. C.
No. 1 V. C.
Dial-knob Shaft
Dial Rubber
Dial-knob Bracket

PART NO. 18579

FIG. 225. VARIABLE-CONDENSER ASSEMBLY.

If any section of this condenser is seriously damaged, the stator, rotor and frame (with balance weight) unit (No. 18579) should be replaced.

IMPORTANT: DO NOT disturb the adjustment of the rotor set-screws nor the bearing screw at the rear end of the shaft.


FROM STATOR No. 1 V.C
TO G1R
COMPENSATING CONDENSER
TO CHASSIS BLACK WITH WHITE TR
TO L.A RED
BLACK
RED-BLK
TO S.A GREEN
FROM ROTOR No. 1 V.C.
FROM STATOR No. 2 V.C BLUE
TO G2R
R. F. C. No. 3
1st STOPPING CONDENSER
7" TO +B WHITE
BLACK
TO P1R GREEN
FROM ROTOR No. 2 V.C.
FROM STATOR No. 3 V.C BLUE
TO G3R
R. F. C. No. 4
2nd STOPPING CONDENSER
4½" TO +B WHITE
BLACK
TO P2R GREEN
FROM ROTOR No. 3 V.C
FROM STATOR No. 4 V.C BLUE
R. F. C. No 5
3rd STOPPING CONDENSER
TO GD BLUE
TO +B WHITE
YELLOW
TO P3R GREEN

No. 1 R F T.

No. 2 R. F. T.

No. 3 R. F T

No. 4 R. F. T.

FIG. 226. CONNECTIONS OF R. F. COIL GROUP IN L-2 AND F CHASSIS.

If one R. F. coil or R. F. C. Nos. 3, 4 or 5, is defective, the complete coil group must be replaced. If the compensating condenser or one of the stopping condensers is defective, it may be replaced without changing anything else.

PARTS AND PRICE LIST—TYPE L, No. 16000, CHASSIS

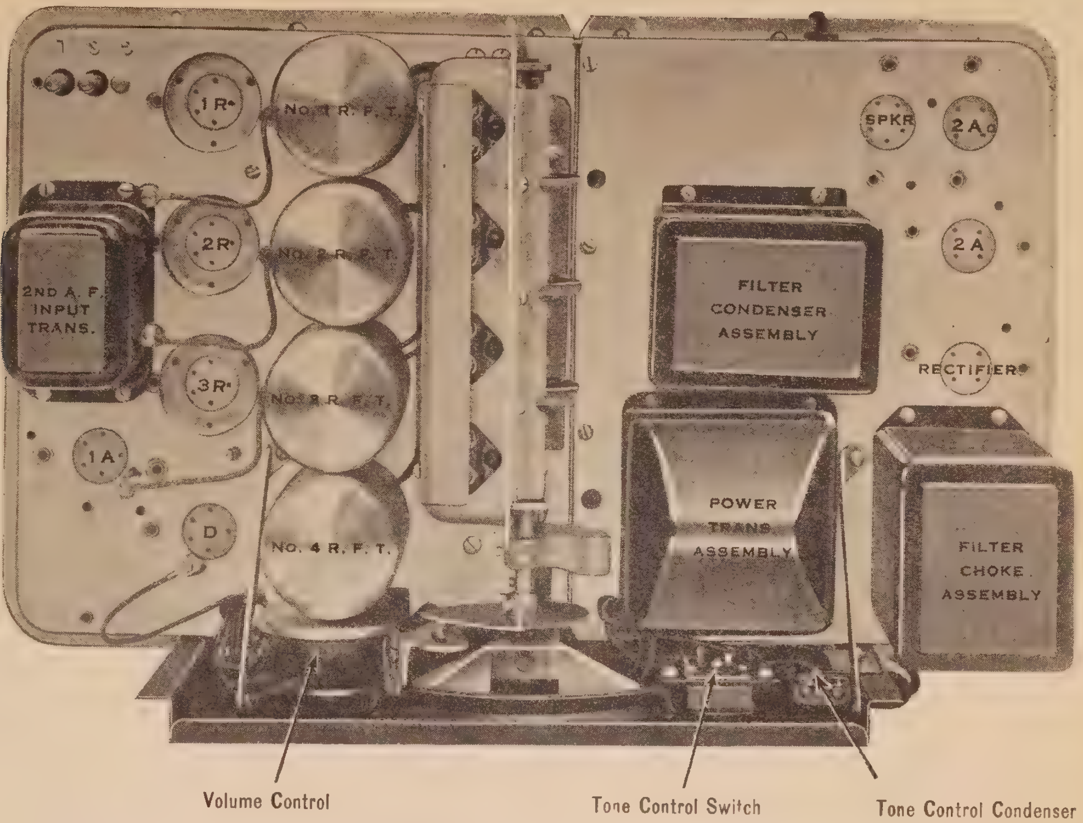


FIG. 227.

TOP VIEW OF TYPE L CHASSIS.

Type P Chassis is similar except for the addition of two binding posts at the rear of the front panel for connection to the pick-up transformer.

Type F Chassis has a different style of power transformer.

Part No.	FRONT PANEL ASSEMBLY	Price
18085	Front panel with dial plate	$1.25
18581	Front panel complete	2.50
17224	Front panel brace (2 used)	.10
17985	Escutcheon	1.00
17244	Volume-control or tone-control knob	.30
16370	On-off switch complete	1.10
16380	Local-distance switch	1.25
16270	Volume-control	3.70
17876	Volume-control bracket	.20
16576	Volume-control cover	.05
18223	Tone-control condenser clamp	.05
17814	Dial knob	.30
17959	Dial pointer	.05

Part No.	POWER UNITS	Price
16660	Power-transformer	$7.50
17825	Power-transformer spring	.10
17824	Power-transformer cover	.50
17563	Power-transformer insulating sheet	.02
	Filter Condenser Unit For L-1	
15480	Filter-condenser (5 taps)	7.95
17429	Filter-condenser cover	.40
17534	Filter-condenser spacer (fibre)	.25/c
	Filter Condenser Unit For L-2	
15850	Filter-condenser (6 taps)	7.95
18188	Filter-condenser case	.45
17534	Filter-condenser spacer (fibre)	.25/c
16680	Filter-choke (5 leads)*	5.75
17302	Filter-choke lid	.20
15520	2nd-A. F. input transformer	3.75

*No. 16680 choke assembly is for use in Type L-2 chassis, but it may be used in Type L-1 chassis by cutting off the black-with-red-tracer lead.

Part No.		Price
18579	VARIABLE-CONDENSER STATOR, ROTOR AND FRAME (WITH LEADS AND BALANCE WEIGHT)	$9.60
17107	Rotor-connection (long)	.10
17291	Rotor-connection (short)	.10
15404	Dial light	.25
16420	Dial-light socket and reflector, one-hole mounting (less lead and resistor)	.40
16420-A	Dial-light socket and reflector, two-hole mounting (less lead and resistor)	.40
18615	Dial-gear	.40
17936	Dial-knob bracket (one-hole mounting)	.35
18144	Dial-knob bracket (two-hole mounting)	.35
17935	Dial-knob bracket support (threaded)	.03
17961	Dial-rubber assembly	.15
17941	Dial-knob shaft	.05
17962	Pointer-control arm	.30

No separate parts, except those listed above, will be supplied for the variable-condenser unit.

16430	TONE-CONTROL SWITCH COMPLETE	.75
18148	Base	.60
18146	Shaft	.12
18112	Contact blade	.03

Part No.	COIL GROUP	Price
18327	R. F. coil group	$4.00
15540	Stopping condenser (3 used)	.10
15540	Compensating condenser (1 used)	.10
17295	R. F. coil shield (4 used)	.50

If one R. F. coil, or R. F. C. No. 3, No. 4, or No. 5 is defective, the ENTIRE coil group must be replaced.

December, 1930. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE L, No. 16000, CHASSIS (Cont'd)

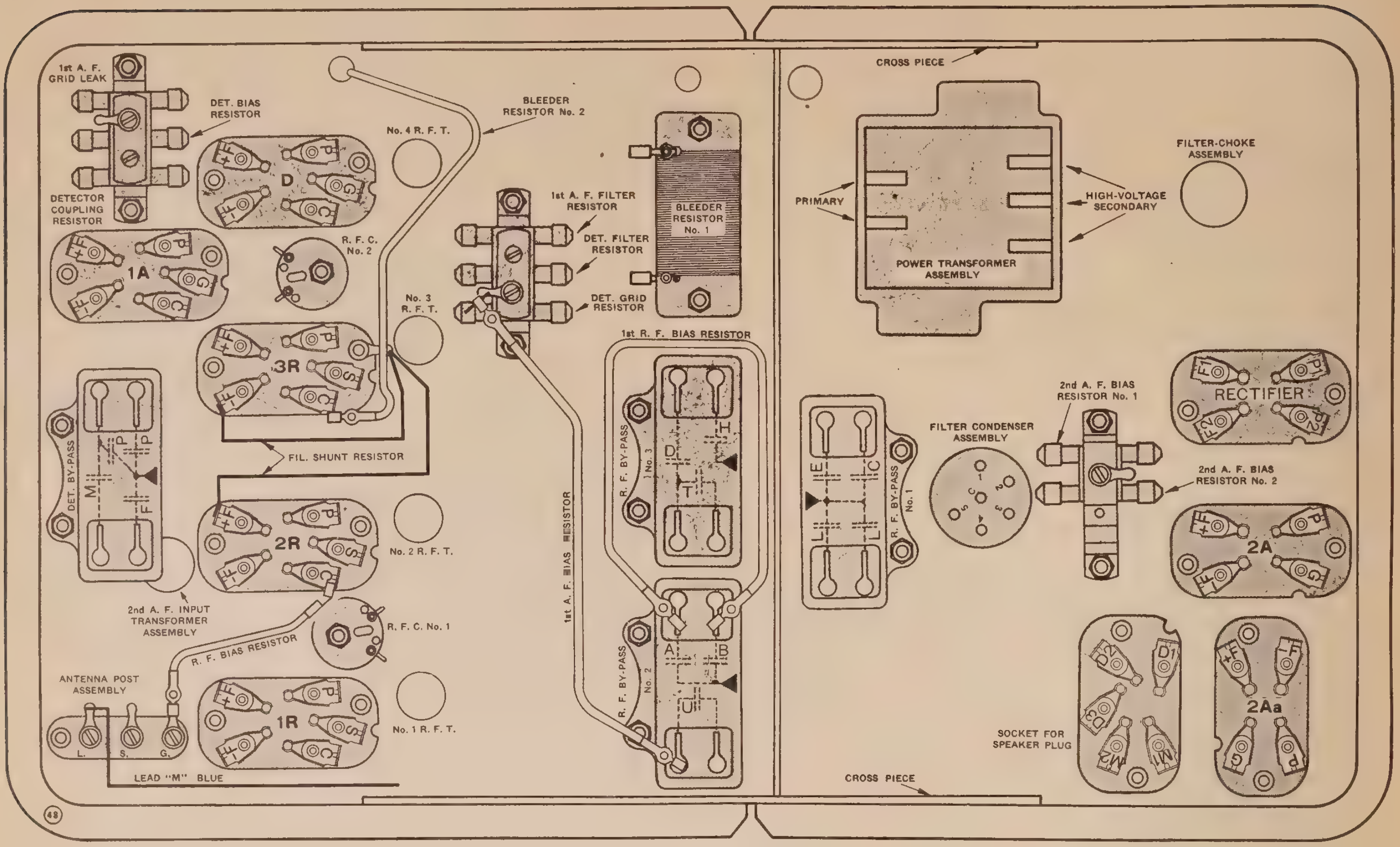

1st A. F. GRID LEAK
DET. BIAS RESISTOR
DETECTOR COUPLING RESISTOR
No. 4 R. F. T.
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
DET. GRID RESISTOR
1st R. F. BIAS RESISTOR
D
1A
R. F. C. No. 2
No. 3 R. F. T.
3R
FIL. SHUNT RESISTOR
DET. BY-PASS
2R
No. 2 R. F. T.
2nd A. F. INPUT TRANSFORMER ASSEMBLY
R. F. BIAS RESISTOR
R. F. C. No. 1
1st A. F. BIAS RESISTOR
R. F. BY-PASS No. 3
R. F. BY-PASS No. 2
ANTENNA POST ASSEMBLY
L.
S.
G.
1R
No. 1 R. F. T.
LEAD "M" BLUE
48
CROSS PIECE
PRIMARY
HIGH-VOLTAGE SECONDARY
POWER TRANSFORMER ASSEMBLY
FILTER-CHOKE ASSEMBLY
2nd A. F. BIAS RESISTOR No. 1
FILTER CONDENSER ASSEMBLY
R. F. BY-PASS No. 1
RECTIFIER
2nd A. F. BIAS RESISTOR No. 2
2A
SOCKET FOR SPEAKER PLUG
2Aa
CROSS PIECE

FIG. 228. BOTTOM VIEW OF TYPE L-2 AND P CHASSIS.

A line fuse (2-amperes) and fuse holder are mounted at the right of R.F. by-pass No. 1 in later-type sets. In L-1 chassis, the filter condenser assembly has five contacts instead of six as shown.

TUBULAR RESISTORS
TWO-RESISTOR GROUP

Part No.		*Price*
15592	2nd-A.F. bias resis. No. 1 (black)	$ .25
16724	2nd-A.F. bias resis. No. 2 (white)	.25
17341	Mounting bracket	.05
17344	Fibre pad	.25/c
17343	Metal clamping strip	.02

THREE-RESISTOR-GROUPS

Part No.		*Price*
16282	1st-A.F. grid leak (blue or blue and red)	$ .25
16724	Detector bias resistor (white)	.25
15592	Detector coupling resistor (black)	.25
15285	1st-A.F. filter resistor (gray)	.50
16724	Detector filter resistor (white)	.25
15892	Detector grid resistor (green)	.25
17341	Mounting bracket	.05
17342	Fibre pad	.25/c
17345	Metal clamping strip	.02

FLEXIBLE RESISTORS

Part No.		*Price*
16350	R.F. bias resistor	$ .20
16320	1st-R.F. bias resistor	.20
16320	1st-A.F. bias resistor	.20
17090	Bleeder resistor No. 2	.20
18236	Dial light resistor (yellow)	.15
17077	Filament shunt resistor	.15

Part No.		*Price*
16330	Bleeder resistor No. 1 (flat type)	$ .40
13306	Insulator (1½" x 3")	.25/c
15271-A	R. F. CHOKE No. 1, NO. 2 (2 used)	.25

FIXED CONDENSERS

Part No.		*Price*
15790	R.F. by-pass No. 1	$1.00
15770	R.F. by-pass No. 2	1.00
15780	R.F. by-pass No. 3	1.10
15640	Detector by-pass	1.00
16490	Tone-control condenser	1.00

SOCKETS

Part No.		*Price*
17518	R.F. sockets (3 used)	$ .30
17519	Detector or 1st-A.F. socket (2 used)	.30
17511	2Aa socket	.25
17509	2A socket	.25
17508	Rectifier socket	.25
18007	Speaker-plug socket	.30
17377	Socket insulator (fibre sheet) (5 used)	.25/c
18016	Speaker-plug-socket insulator	.25/c
18449	Fuse socket	.15
16420	Dial-light socket and reflector, one-hole mounting (less leads)	.40
16420-A	Dial-light socket and reflector, two-hole mounting (less leads)	.40

December, 1930. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE L, No. 16000, CHASSIS (Cont'd)

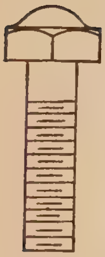
MISCELLANEOUS PARTS

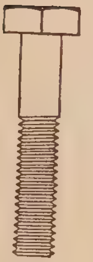
Part No.		Price
17524	110-volt cable with plug	$1.90
8956	110-volt plug only	.30
16741	Insulating bushing for 110-volt cable	.05
16742	Bushing-retaining spring	.05
17521	Antenna binding posts and base	.45
17323	Antenna and ground post base	.05
8215	Binding post	.20
17536	Bottom plate	1.30
18117	Balance weight for variable condenser	.35
13989	Ground clamp	.30
15213	Tube-shield (3 used)	.15

Part No.		Price
15214	Tube-shield base (3 used)	$ .03
17326	Detector cap	.30
17223	Cross piece (10″ x ⅞″—2 used)	.25
17632	Detector-cap lead (brown)	.10
	Trimmer-condenser sealing wax	.50 lb.
18118	"Guide" Card (form F-680)	.75/c net
18119	Log Card (form F-681)	.75/c net
17989	Tuned-radio-frequency name-plate	.06
18534	Line fuse (2-ampere)	.05
16220	Literature assembly	.20 net
18122	Instruction book	.10 "
18123	Shipping container	.65 "

SMALL PARTS ON L, F, P, Q, D RECEIVERS, AND J, JB, N, N-3 SPEAKERS

ILLUSTRATIONS ARE FULL SIZE


18092
$ .04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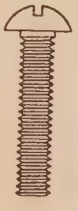
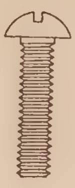

3718
$ .02


13052
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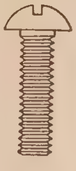
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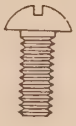
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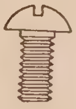
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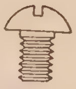
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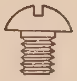
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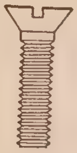
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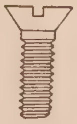
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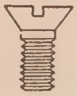
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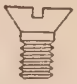
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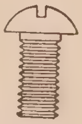
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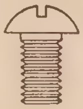
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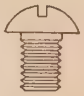
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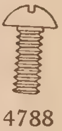
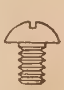

14788
$ .20/c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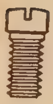
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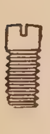
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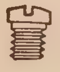
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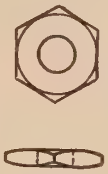
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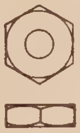
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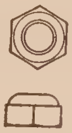
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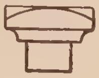
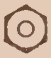
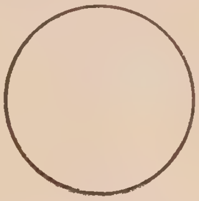
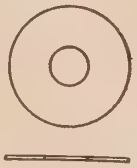
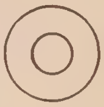
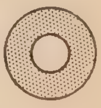

17507
$ .05

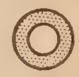

17868
$ .02

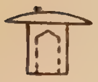

16492 (Felt)
$ .04—⅜″ thick

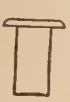

15134 (Leather)
$ .01

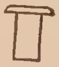

13928
$ .01

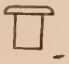

13145 (Fibre)
$ .25/c

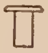

3419 (Fibre)
$ .15/c


17679
$ .01

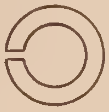

8249
$ .50/c

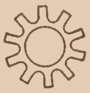

16771
$ .30/c

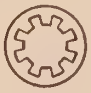

9128
$ .30/c

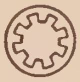

9206
$ .20/c

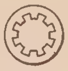
8272
$ .02

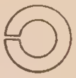

18095
$ .40/c

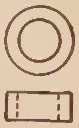

17204
$ .40/c

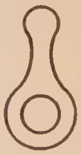

17433
$ .50/c

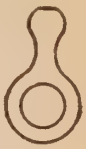

17432
$ .50/c

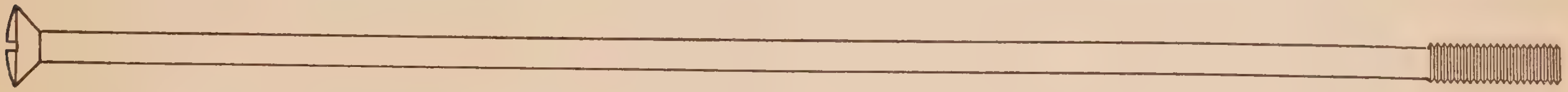

18127
$ .45/c

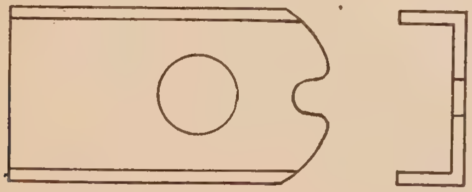

8220
$ .10/c

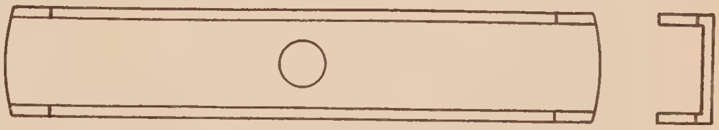

17775
$ .02

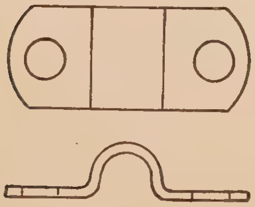

9678
$ .50/c

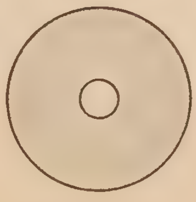

9675
$ .50/c

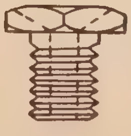

16495—$ .10

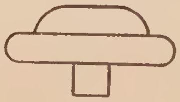

16512—Clamp—$ .05

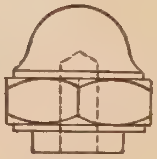

18389—Strap—$ .05


17827
$ .05


16168—Rubber
$ .02


16499
$ .15


15414—Foot
$ .08


18388
$ .25

December, 1930. These prices supersede all previous prices and are subject to change without notice.

TYPE F CHASSIS, DIAGRAM AND PARTS LIST

(For Voltage Table, See Page 253)

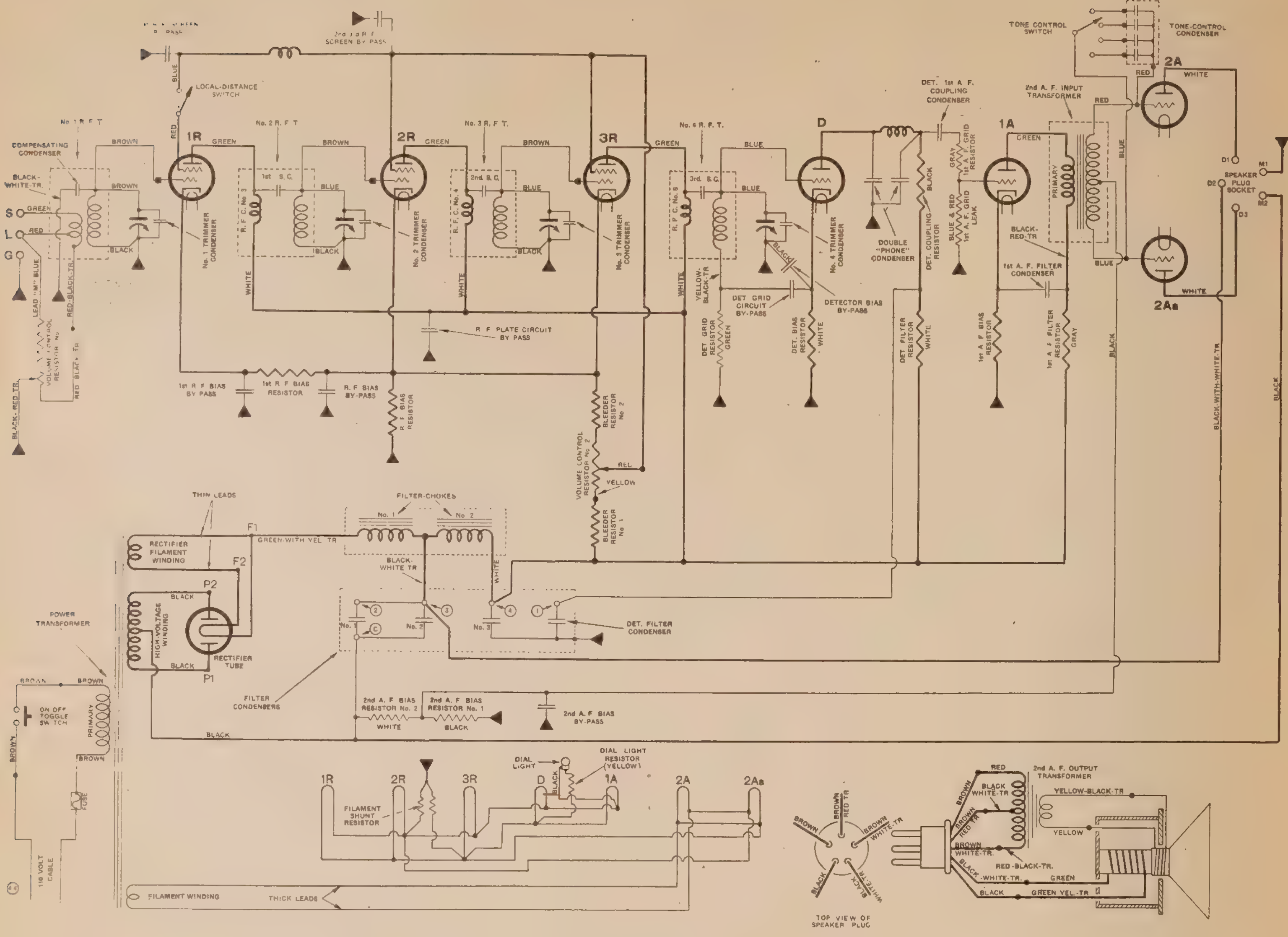

2nd 3rd R. F. SCREEN BY PASS
LOCAL-DISTANCE SWITCH
No. 1 R. F. T.
No. 2 R. F. T.
No. 3 R. F. T.
No. 4 R. F. T.
1R
2R
3R
D
1A
2A
2As
COMPENSATING CONDENSER
BLACK-WHITE-TR.
S
L
G
GREEN
RED
BROWN
BLUE
BLACK
WHITE
1st S. C.
2nd S. C.
3rd. S. C.
R. F. C. No. 3
R. F. C. No. 4
R. F. C. No. 5
No. 1 TRIMMER CONDENSER
No. 2 TRIMMER CONDENSER
No. 3 TRIMMER CONDENSER
No. 4 TRIMMER CONDENSER
LEAD "M" BLUE
RED-BLACK-TR.
VOLUME CONTROL RESISTOR No. 1
RED BLACK TR
BLACK-RED-TR.
R. F. PLATE CIRCUIT BY PASS
1st R. F. BIAS BY PASS
1st R. F. BIAS RESISTOR
R. F. BIAS BY-PASS
R. F. BIAS RESISTOR
BLEEDER RESISTOR No. 2
VOLUME CONTROL RESISTOR No. 2
BLEEDER RESISTOR No. 1
REL
YELLOW
YELLOW-BLACK-TR
DET GRID CIRCUIT BY-PASS
DETECTOR BIAS BY-PASS
DET GRID RESISTOR
DET. BIAS RESISTOR
DOUBLE "PHONE" CONDENSER
DET. 1st A. F. COUPLING CONDENSER
DET. COUPLING RESISTOR
DET FILTER RESISTOR
GRAY
1st A. F. GRID RESISTOR
BLUE & RED
1st A. F. GRID LEAK
BLACK-RED-TR
1st A. F. FILTER CONDENSER
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
2nd A. F. INPUT TRANSFORMER
PRIMARY
TONE CONTROL SWITCH
TONE-CONTROL CONDENSER
D1
D2
D3
M1
M2
SPEAKER PLUG SOCKET
BLACK-WITH-WHITE-TR
THIN LEADS
RECTIFIER FILAMENT WINDING
F1
F2
P1
P2
GREEN-WITH YEL TR
FILTER-CHOKES
No. 1
No. 2
BLACK-WHITE TR
HIGH-VOLTAGE WINDING
RECTIFIER TUBE
POWER TRANSFORMER
FILTER CONDENSERS
No. 1
No. 2
No. 3
2
3
4
1
C
DET. FILTER CONDENSER
2nd A. F. BIAS RESISTOR No. 2
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS BY-PASS
ON OFF TOGGLE SWITCH
PRIMARY
FUSE
110 VOLT CABLE
FILAMENT SHUNT RESISTOR
DIAL LIGHT
DIAL LIGHT RESISTOR (YELLOW)
FILAMENT WINDING
THICK LEADS
TOP VIEW OF SPEAKER PLUG
BROWN RED TR
BROWN WHITE-TR
BLACK WHITE-TR
2nd A. F. OUTPUT TRANSFORMER
BLACK WHITE-TR
BROWN RED TR
BROWN WHITE-TR.
RED-BLACK-TR.
BLACK-WHITE-TR.
GREEN YEL.-TR

FIG. 229. WIRING DIAGRAM OF TYPE F CHASSIS.

In some early-type F chassis, a line by-pass condenser is used and the 1st-A. F. grid resistor (gray) is omitted. In later-type F chassis, the filter condenser has only four contacts, as shown on Page 232, and the top of the 1st-A.F. grid leak is connected to the opposite end of the 1st-A.F. grid resistor, as shown on Page 233.

PARTS AND PRICE LIST—TYPE F, No. 16100, CHASSIS

All parts not listed below are same as those used in Type L, No. 16000, Chassis, on Pages 227, 228 and 229.

Part No.		*Price*
15880	Power-transformer	$12.00
18645	Power-transformer lid with name-plate	.20
16520	Filter-condenser assembly	7.95
18188	Filter-condenser case	.45
17534	Filter-condenser spacer (fibre)	.25/c
16260	Filter-choke	7.50
17302	Filter-choke lid	.20

Part No.		*Price*
15790	R.F. by-pass No. 1 (before No. 5802566)	$1.00
15262	R.F. by-pass No. 1 (after No. 5802566)	1.00
15285	1st-A.F. grid resistor, gray (after No. 5802566)	.50
16590	Literature assembly	.20 net
18256	Instruction book	.10 "
18257	Shipping container	.65 "

December, 1930. These prices supersede all previous prices and are subject to change without notice.

TYPE P CHASSIS, DIAGRAM AND PARTS LIST

(For Voltage Table, See Page 221.)

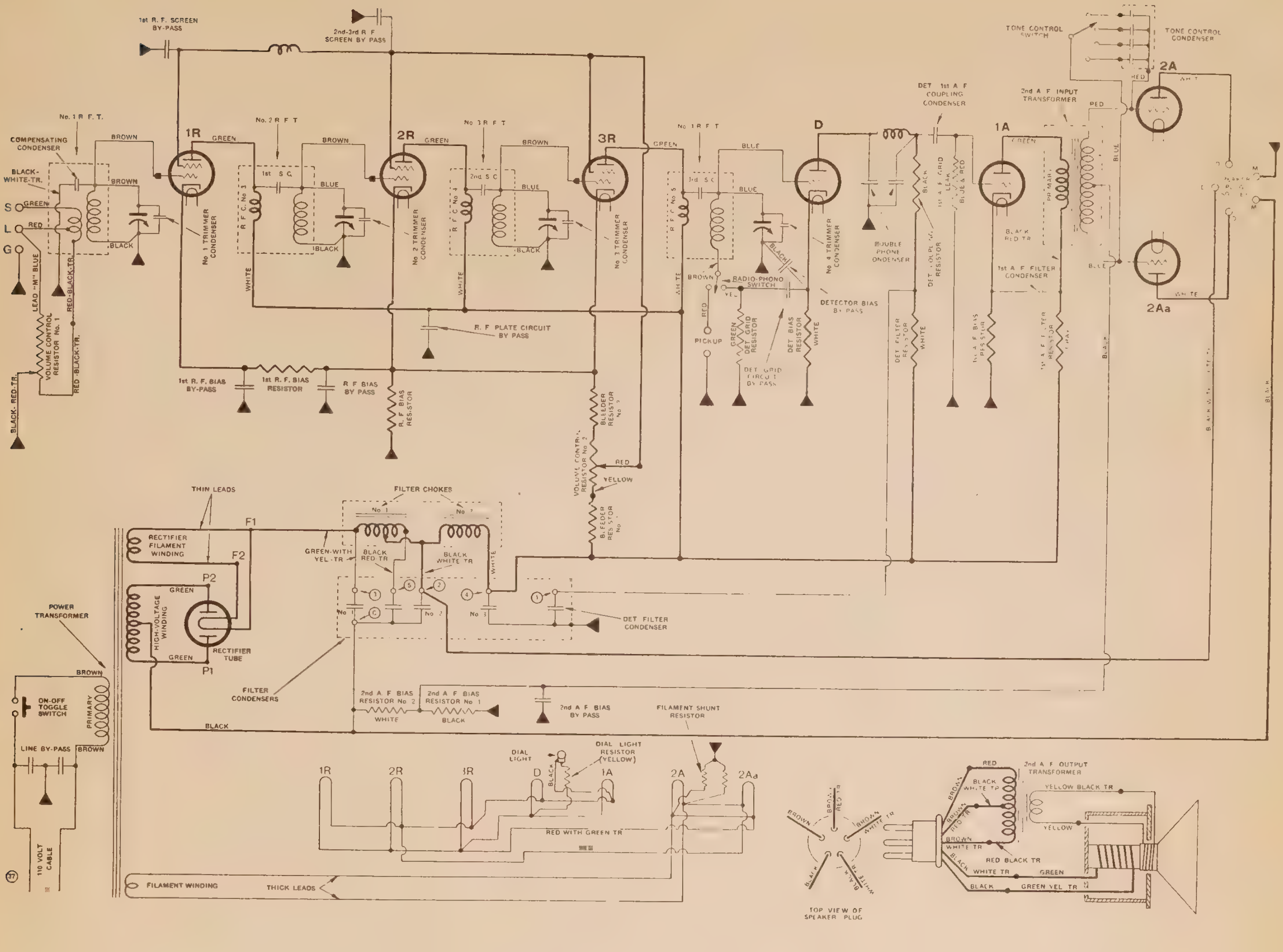

1st R. F. SCREEN BY-PASS
2nd-3rd R F SCREEN BY PASS
No. 1 R F. T.
No. 2 R F T
No 3 R F T
No 1 R F T
COMPENSATING CONDENSER
BLACK-WHITE-TR.
S
L
G
GREEN
RED
BROWN
BLACK
1R
2R
3R
D
1A
2A
2Aa
1st S G
2nd S C
3rd S C
BLUE
WHITE
R F C. No 3
R F C No 4
R F C No 5
No 1 TRIMMER CONDENSER
No 2 TRIMMER CONDENSER
No 3 TRIMMER CONDENSER
No 4 TRIMMER CONDENSER
LEAD "M" BLUE
RED-BLACK-TR.
VOLUME CONTROL RESISTOR No. 1
RED-BLACK-TR.
BLACK-RED-TR.
R. F PLATE CIRCUIT BY PASS
1st R. F. BIAS BY-PASS
1st R. F. BIAS RESISTOR
R F BIAS BY PASS
R. F BIAS RESISTOR
BLEEDER RESISTOR No 2
VOLUME CONTROL RESISTOR No 2
YELLOW
BLEEDER RESISTOR No 1
TONE CONTROL SWITCH
TONE CONTROL CONDENSER
DET 1st A F COUPLING CONDENSER
2nd A F INPUT TRANSFORMER
RADIO-PHONO SWITCH
YEL
PICKUP
DET GRID RESISTOR
DET GRID CIRCUIT BY PASS
DET BIAS RESISTOR
DETECTOR BIAS BY PASS
DOUBLE PHONE CONDENSER
DET COUPLING RESISTOR
1st A F GRID LEAK
BLUE & RED
DET FILTER RESISTOR
BLACK RED TR
PRIMARY
1st A F FILTER CONDENSER
1st A F BIAS RESISTOR
1st A F FILTER RESISTOR
GRAY
SPEAKER PLUG
M
BLACK WHITE TR
THIN LEADS
F1
F2
P2
P1
RECTIFIER FILAMENT WINDING
HIGH-VOLTAGE WINDING
RECTIFIER TUBE
POWER TRANSFORMER
FILTER CHOKES
No 1
No 2
GREEN-WITH YEL-TR
BLACK WHITE TR
No 3
DET FILTER CONDENSER
FILTER CONDENSERS
2nd A F BIAS RESISTOR No 2
2nd A F BIAS RESISTOR No 1
2nd A F BIAS BY PASS
FILAMENT SHUNT RESISTOR
ON-OFF TOGGLE SWITCH
LINE BY-PASS
110 VOLT CABLE
37
DIAL LIGHT
DIAL LIGHT RESISTOR (YELLOW)
RED WITH GREEN TR
FILAMENT WINDING
THICK LEADS
TOP VIEW OF SPEAKER PLUG
BROWN WHITE TR
BROWN RED TR
BLACK WHITE TR
2nd A F OUTPUT TRANSFORMER
YELLOW BLACK TR
RED BLACK TR
WHITE TR
GREEN YEL TR

FIG. 230. WIRING DIAGRAM OF TYPE P CHASSIS.

In later-type P sets, the filament shunt resistor is connected across the R.F. filaments, as shown in Fig. 229. Also, a 2-ampere fuse is connected in one side of the 110-volt line.

PARTS AND PRICE LIST—TYPE P, No. 16600, CHASSIS

All parts not listed below are same as those used in Type L, No. 16000, Chassis, on Pages 227, 228 and 229.

Part No.		*Price*
18544	Phono-radio switch	$1.25
17040	Phonograph post assembly	.45
18546	Binding post (marked G)	.20
8215	Binding post (plain)	.20

Part No.		*Price*
18548	Instruction sheet	$ .10 net
17060	Literature assembly	.20 "
18547	Shipping container	.65 "

For phonograph parts, see Page 239.

December, 1930. These prices supersede all previous prices and are subject to change without notice.

TYPE F CHASSIS RECEIVER

Condensers in R.F. By-Pass No. 1

C—2nd-A.F. bias by-pass.
E—1st-R.F. screen by-pass.
F—2nd-3rd-R. F. screen by-pass.

Condensers in R.F. By-Pass No. 2

A—1st-R.F. bias by-pass.
B—R.F. bias by-pass.
U—1st-A.F. filter condenser.

Condensers in R.F. By-Pass No. 3

D—Detector bias by-pass.
H—R.F. plate-circuit by-pass.
T—Detector grid-circuit by-pass.

Condensers in Detector By-Pass

M—Detector-1st A.F. coupling condenser.
P—"Phone" condenser.
P—"Phone" condenser.
R—Filament by-pass.

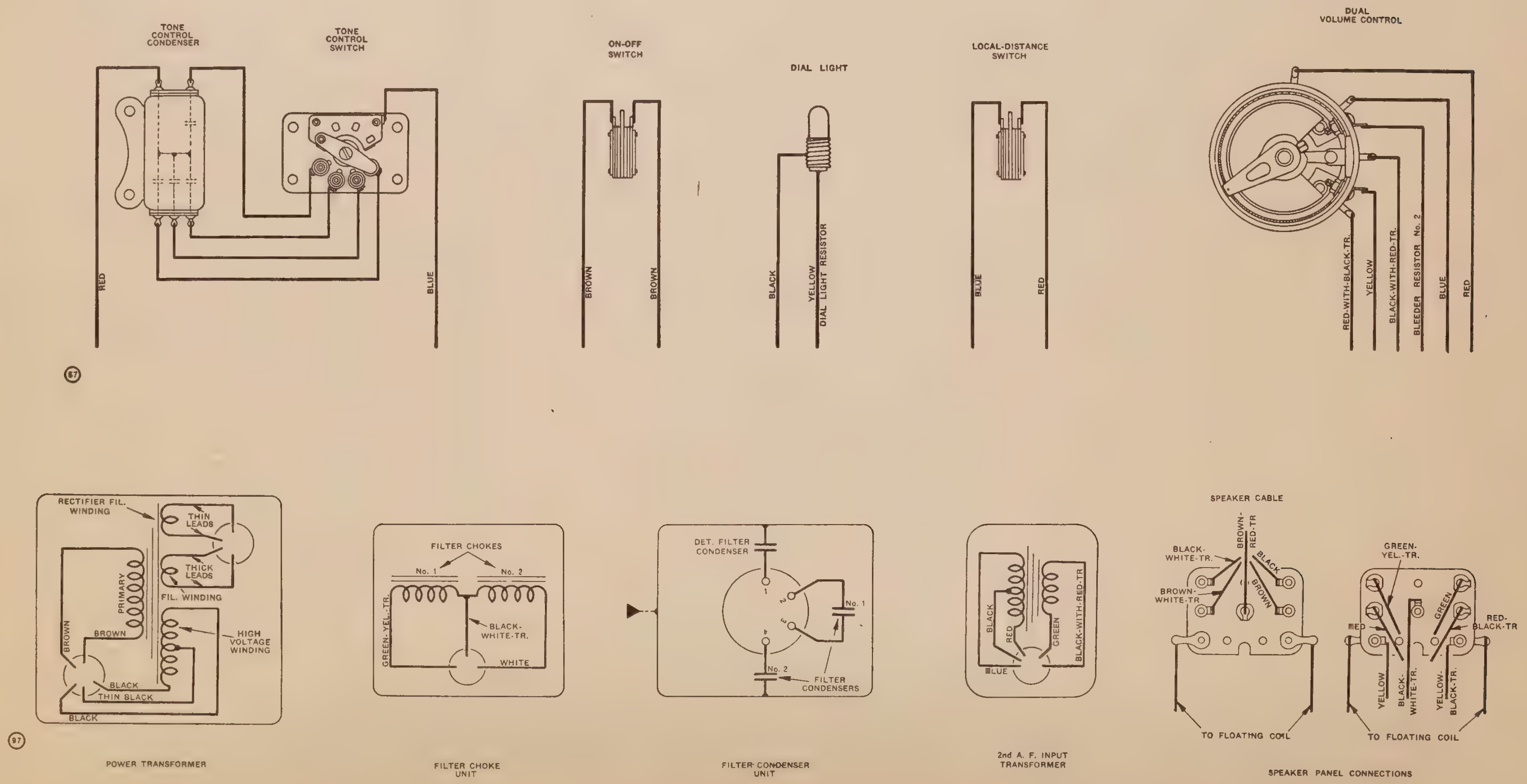

TONE CONTROL CONDENSER
TONE CONTROL SWITCH
RED
BLUE
ON-OFF SWITCH
BROWN
BROWN
DIAL LIGHT
BLACK
YELLOW
DIAL LIGHT RESISTOR
LOCAL-DISTANCE SWITCH
BLUE
RED
DUAL VOLUME CONTROL
RED-WITH-BLACK-TR.
YELLOW
BLACK-WITH-RED-TR.
BLEEDER RESISTOR No. 2
BLUE
RED
97
RECTIFIER FIL. WINDING
THIN LEADS
THICK LEADS
PRIMARY
FIL. WINDING
HIGH VOLTAGE WINDING
BROWN
BROWN
BLACK
THIN BLACK
BLACK
97
POWER TRANSFORMER
FILTER CHOKES
No. 1
No. 2
GREEN-YEL.-TR.
BLACK-WHITE-TR.
WHITE
FILTER CHOKE UNIT
DET. FILTER CONDENSER
1
2
3
4
No. 1
No. 2
FILTER CONDENSERS
FILTER CONDENSER UNIT
BLACK
RED
BLUE
GREEN
BLACK-WITH-RED-TR
2nd A. F. INPUT TRANSFORMER
SPEAKER CABLE
BLACK-WHITE-TR.
BROWN-RED-TR
BLACK
BROWN
BROWN-WHITE-TR
TO FLOATING COIL
GREEN-YEL.-TR.
RED
GREEN
RED-BLACK-TR
YELLOW
BLACK-WHITE-TR.
YELLOW-
BLACK-TR.
TO FLOATING COIL
SPEAKER PANEL CONNECTIONS

Fig. 231. Connections of Units in Type F Chassis.
In some early Type F Chassis, the filter condenser has five contacts, as shown on Page 230.

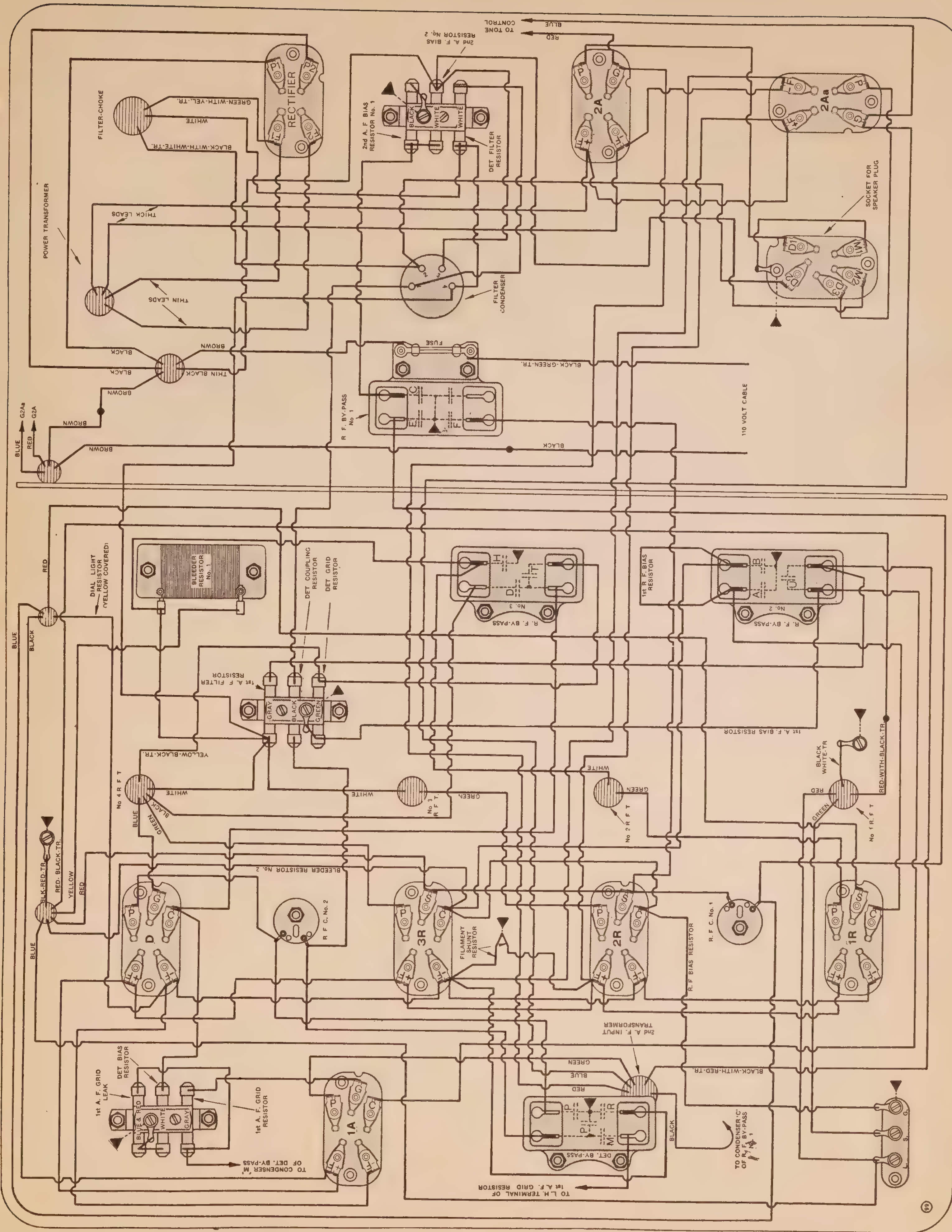

RECTIFIER
FILTER-CHOKE
POWER TRANSFORMER
GREEN-WITH-YEL.-TR.
WHITE
BLACK-WITH-WHITE-TR.
THICK LEADS
THIN LEADS
BROWN
BLACK
THIN BLACK
BLUE
RED
G2Aa
G2A
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS RESISTOR No. 2
DET FILTER RESISTOR
TO TONE CONTROL
FILTER CONDENSER
FUSE
BLACK-GREEN-TR.
R. F. BY-PASS No. 1
110 VOLT CABLE
2A
2Aa
SOCKET FOR SPEAKER PLUG
BLEEDER RESISTOR No. 1
DIAL LIGHT RESISTOR (YELLOW COVERED)
DET COUPLING RESISTOR
DET GRID RESISTOR
1st A. F. FILTER RESISTOR
GRAY
GREEN
YELLOW-BLACK-TR.
R. F. BY-PASS No. 3
R. F. BY-PASS No. 2
1st R. F. BIAS RESISTOR
1st A. F. BIAS RESISTOR
No 4 R F T
No 1 R F T
No 2 R F T
No 1 R F T
BLACK WHITE TR
RED-WITH-BLACK-TR
BLEEDER RESISTOR No. 2
BLK-RED-TR.
RED. BLACK-TR.
YELLOW
D
R F C. No. 2
3R
FILAMENT SHUNT RESISTOR
2R
R. F BIAS RESISTOR
R F C. No. 1
1R
DET. BIAS RESISTOR
1st A. F. GRID LEAK
BLUE & RED
1st A. F. GRID RESISTOR
TO CONDENSER "M" OF DET. BY-PASS
1A
2nd A. F. INPUT TRANSFORMER
BLACK-WITH-RED-TR.
DET. BY-PASS
TO CONDENSER "C" OF R. F. BY-PASS No 1
TO L.H. TERMINAL OF 1st A. F. GRID RESISTOR
P
G
C
F
L
S
G

FIG. 232. BOTTOM WIRING OF TYPE F CHASSIS RECEIVER.

In some early Type F Chassis, a line by-pass condenser is used, and the 1st-A. F. grid resistor (gray) is omitted. Also, the filter condenser has five contacts, as shown on Page 230.

TYPE P CHASSIS RECEIVER

Condensers in R.F. By-Pass No. 1

L—Line by-pass.
L—Line by-pass.
C—2nd-A.F. bias by-pass.
E—1st-R.F. screen by-pass.

Condensers in R.F. By-Pass No. 2

A—1st-R.F. bias by-pass.
B—R.F. bias by-pass.
U—1st-A.F. filter condenser.

Condensers in R.F. By-Pass No. 3

D—Detector bias by-pass.
H—R.F. plate-circuit by-pass.
T—Detector grid-circuit by-pass.

Condensers in Detector By-Pass

F—2nd-3rd R.F. screen by-pass.
M—Detector-1st A.F. coupling condenser.
P—Phone condenser.
P—Phone condenser.

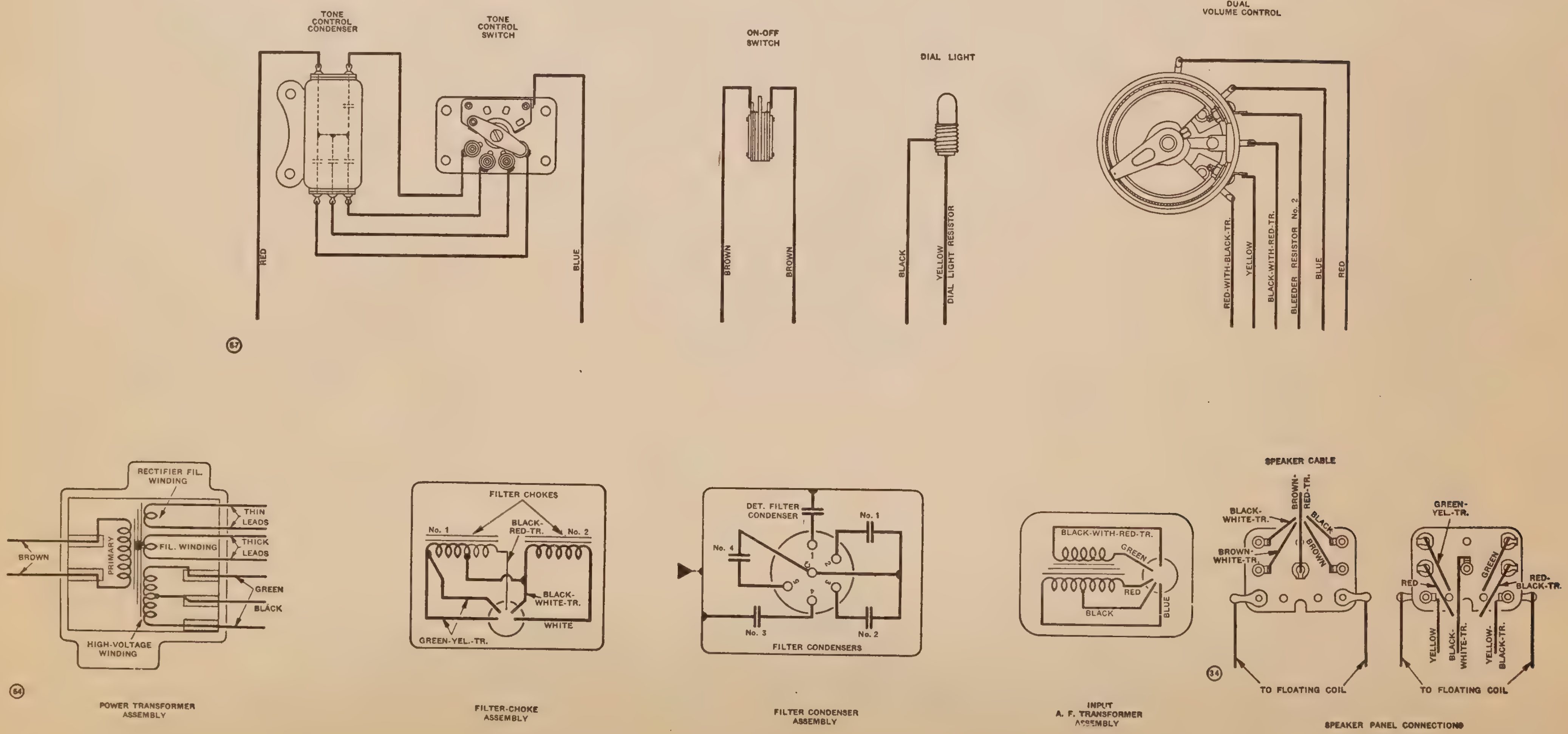

TONE CONTROL CONDENSER
TONE CONTROL SWITCH
RED
BLUE
ON-OFF SWITCH
BROWN
BROWN
DIAL LIGHT
BLACK
YELLOW
DIAL LIGHT RESISTOR
DUAL VOLUME CONTROL
RED-WITH-BLACK-TR.
YELLOW
BLACK-WITH-RED-TR.
BLEEDER RESISTOR No. 2
BLUE
RED
RECTIFIER FIL. WINDING
THIN LEADS
THICK LEADS
BROWN
PRIMARY
FIL. WINDING
GREEN
BLACK
HIGH-VOLTAGE WINDING
POWER TRANSFORMER ASSEMBLY
FILTER CHOKES
No. 1
BLACK-RED-TR.
No. 2
BLACK-WHITE-TR.
WHITE
GREEN-YEL.-TR.
FILTER-CHOKE ASSEMBLY
DET. FILTER CONDENSER
No. 1
No. 4
No. 3
No. 2
FILTER CONDENSERS
FILTER CONDENSER ASSEMBLY
BLACK-WITH-RED-TR.
GREEN
RED
BLACK
BLUE
INPUT A. F. TRANSFORMER ASSEMBLY
SPEAKER CABLE
BROWN-RED-TR.
BLACK-WHITE-TR.
BLACK
BROWN
BROWN-WHITE-TR.
TO FLOATING COIL
GREEN-YEL.-TR.
GREEN
RED
RED-BLACK-TR.
YELLOW
BLACK-WHITE-TR.
YELLOW-BLACK-TR.
TO FLOATING COIL
SPEAKER PANEL CONNECTIONS

Fig. 233. Connection of Units in Type P Chassis, and, at Right, Connections to Terminal Panel of Type N Speaker.

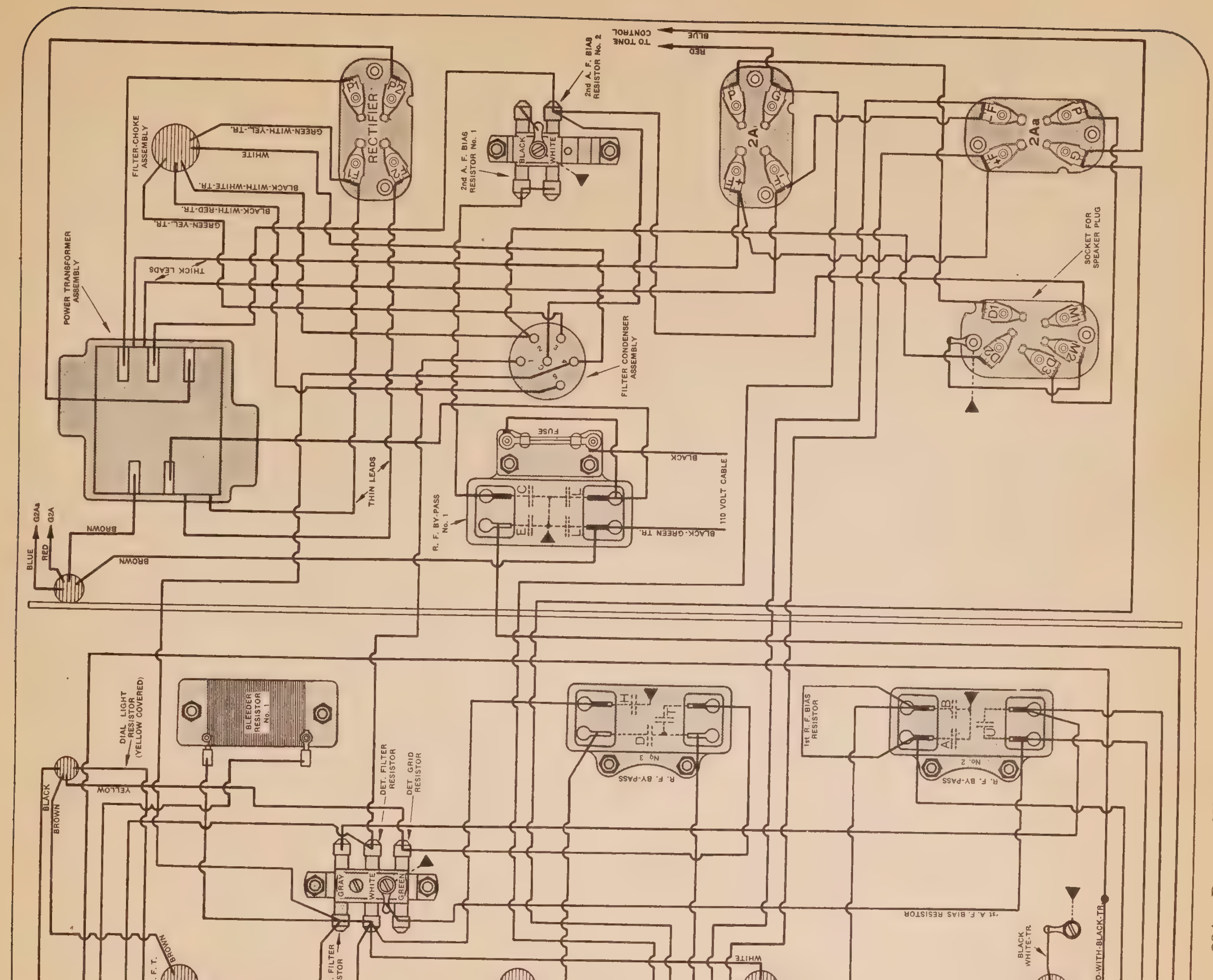

TO TONE CONTROL
BLUE
RED
2nd A. F. BIAS RESISTOR No. 2
2nd A. F. BIAS RESISTOR No. 1
BLACK
WHITE
RECTIFIER
FILTER-CHOKE ASSEMBLY
GREEN-WITH-YEL.-TR.
WHITE
BLACK-WITH-WHITE-TR.
BLACK-WITH-RED-TR.
GREEN-YEL.-TR.
THICK LEADS
POWER TRANSFORMER ASSEMBLY
2A
2Aa
FILTER CONDENSER ASSEMBLY
SOCKET FOR SPEAKER PLUG
FUSE
BLACK
110 VOLT CABLE
BLACK-GREEN TR.
R. F. BY-PASS No. 1
THIN LEADS
BROWN
G2Aa
G2A
BLEEDER RESISTOR No. 1
DIAL LIGHT RESISTOR (YELLOW COVERED)
YELLOW
DET. FILTER RESISTOR
DET. GRID RESISTOR
GRAY
GREEN
R. F. BY-PASS No 3
R. F. BY-PASS No. 2
1st R. F. BIAS RESISTOR
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
No. 4 R. F. T.
No 3 R. F. T.
No. 2 R. F. T
No 1 R. F. T.
BLACK WHITE-TR.
RED-WITH-BLACK-TR.
BLEEDER RESISTOR No. 2
BLK-RED-TR.
RED-BLACK-TR.
D
R. F. C. No. 2
3R
FILAMENT SHUNT RESISTOR
2R
R. F. BIAS RESISTOR
R. F. C. No. 1
1R
2nd A. F. INPUT TRANSFORMER
BLACK-WITH-RED-TR.
TO CONDENSER 'C' OF R. F. BY-PASS No. 1
DET. BY-PASS
1A
1st A. F. GRID LEAK
DET. BIAS RESISTOR
BLUE & RED
DET. COUPLING RESISTOR

FIG. 234. BOTTOM WIRING OF TYPE P CHASSIS.

PHONOGRAPH PICK-UP

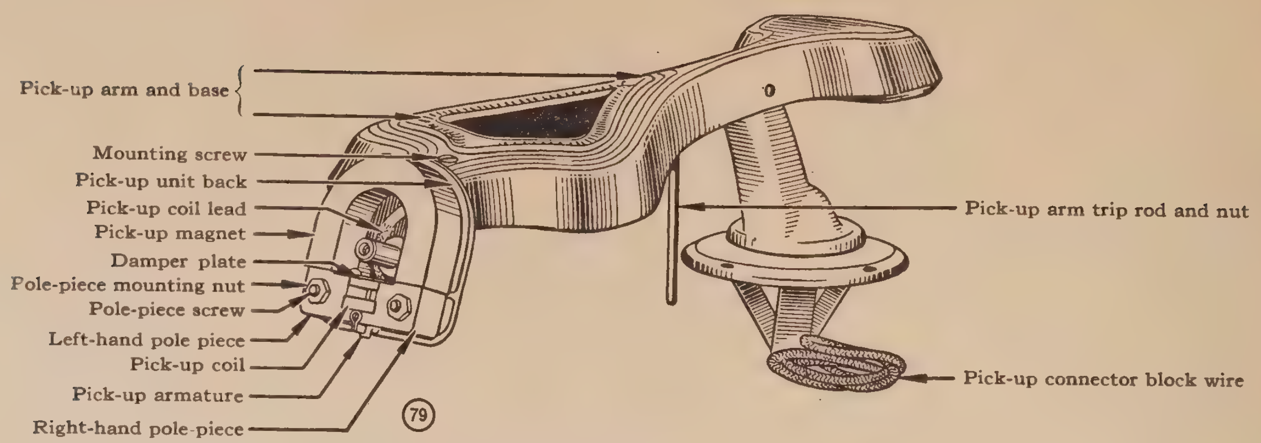

Pick-up arm and base
Mounting screw
Pick-up unit back
Pick-up coil lead
Pick-up magnet
Damper plate
Pole-piece mounting nut
Pole-piece screw
Left-hand pole piece
Pick-up coil
Pick-up armature
Right-hand pole-piece
Pick-up arm trip rod and nut
Pick-up connector block wire
79

FIG. 235. DRAWING OF PHONOGRAPH PICK-UP AND ARM USED IN MODEL 75.

ACTION OF PICK-UP

The phonograph pick-up is a miniature alternating-current generator, but instead of having a rotating armature, it has a vibrating armature. The vibrations of the armature are produced by the movement of the pick-up needle in the grooves on a phonograph record.

The armature vibrates in a narrow gap between the pole pieces of a strong permanent magnet, thus causing a variation of the magnetic field in the gap. This variation of the magnetic field "cuts" the turns of a small pick-up coil which is also mounted in the field of the magnet, thus generating a weak alternating current in the pick-up coil.

The weak alternating current generated in the pick-up coil is passed through a volume control into the primary (small winding) of a step-up transformer.

The resultant voltage developed across the secondary of this transformer is impressed on the grid circuit of the detector tube in the P Chassis. The signal is amplified to loud-speaker volume by the audio amplifier in the P Chassis, and then reproduced by the speaker.

Thus the image of sound waves cut in the grooves in a phonograph record generates similar audio-frequency electrical impulses in the pick-up. These impulses are amplified in the radio set and then converted into sound waves by the speaker.

ARMATURE ADJUSTMENT

The armature-pivot bearings consist of two small strips of rubber (armature spacing cushions) which space the armature from the bearing surfaces on each pole piece.

The top end of the armature fits in a slit in a flat rubber damper. The damper is fastened to a small brass plate that may be adjusted to the right or to the left, in order to center the armature in the magnet gap.

If the armature is off center, as indicated by erratic reproduction, loosen the two round-head screws that hold the damper plate, and move the plate slightly to the right or left to a point where the armature is centered. Tighten the two screws.

When the armature is correctly centered, it should take as much force to move the needle to the left as to the right.

If the rubber damper plate or armature spacing cushions are dried out, or lack life, replace them with new pieces of rubber, which may be secured from your distributor.

USE KEEPER ON PICK-UP MAGNET

If the pick-up magnet must be removed from the pick-up, *FIRST* place a steel or iron keeper (a large nail will do) across the sides of the magnet poles, *THEN* remove the magnet.

Do *NOT* take off the keeper until *AFTER* the magnet is placed back on its pole pieces in the pick-up.

If the magnet is weak, have it re-magnetized, but be sure to place a keeper across the sides of the magnet poles before removing it from the magnetizer, and do not remove the keeper until after the magnet is placed back on its pole pieces in the pick-up.

CONTINUITY TESTS

Test across the two contacts on the neck of the molded pick-up back. The continuity reading should be nearly full. No reading indicates an open pick-up coil or leads.

Test from either contact on the pick-up to each pole piece, and to the armature. If there is any reading, it indicates that the pick-up coil or leads are grounded. This must be eliminated. Use two small pieces of thin cambric cloth to insulate the pick-up coil from the pole pieces.

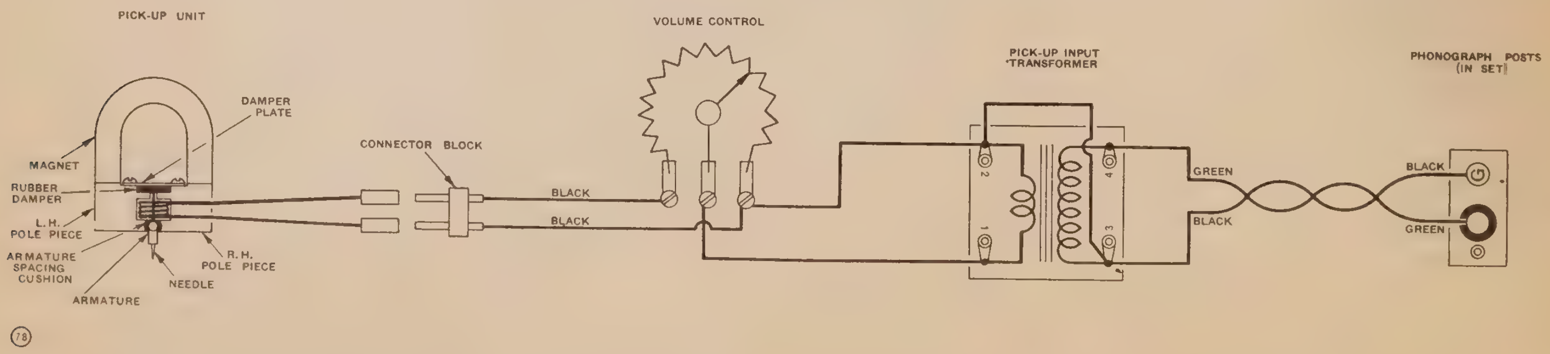

PICK-UP UNIT
VOLUME CONTROL
PICK-UP INPUT TRANSFORMER
PHONOGRAPH POSTS (IN SET)
DAMPER PLATE
CONNECTOR BLOCK
MAGNET
RUBBER DAMPER
L.H. POLE PIECE
ARMATURE SPACING CUSHION
ARMATURE
NEEDLE
R.H. POLE PIECE
BLACK
BLACK
2
1
4
3
GREEN
BLACK
BLACK
GREEN
78

FIG. 236. ELECTRICAL CONNECTIONS OF PICK-UP, VOLUME CONTROL AND INPUT TRANSFORMER.

INDUCTION DISC PHONOGRAPH MOTOR

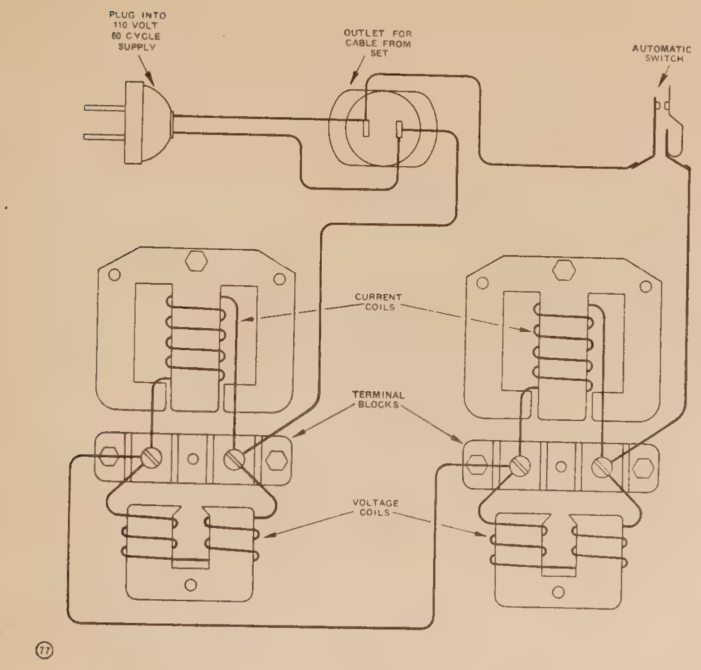

PLUG INTO 110 VOLT 60 CYCLE SUPPLY
OUTLET FOR CABLE FROM SET
AUTOMATIC SWITCH
CURRENT COILS
TERMINAL BLOCKS
VOLTAGE COILS
77

Fig. 237. Electrical Connections of the Induction-disc Phonograph Motor.

The induction-disc phonograph motor has two sets of field coils or "inductors." Each inductor has three coils and five "poles." A magnetic field is produced between the poles by the alternating current flowing through the three coils.

The edge of a non-magnetic rotor disc fits in the narrow gap between the poles on each inductor. The magnetic field between the poles causes the disc to rotate.

The rotor disc itself has no coils, and there are no electrical connections to it.

The speed of the rotor disc is controlled by a governor and a regulating screw device. The correct speed is 78 revolutions per minute (with pick-up on record). The speed may be determined by counting the number of revolutions made by the turntable in one minute. It is preferable, however, to regulate the speed with the aid of a stroboscope disc, which may be purchased from your distributor. Simple instructions for the use of this inexpensive device are printed on the back of the stroboscope disc. The speed should be checked at least twice a year.

The motor and governor bearings and gears must be kept well greased at all times. See chart on bottom of motor board.

When an induction-disc motor requires repair, it is advisable to tear it down completely, replace the defective parts, clean and grease all parts, and reassemble correctly.

AUTOMATIC ELECTRIC SWITCH and FRICTION BRAKE

GENERAL DESCRIPTION

A trip rod on the pick-up arm engages with the slot between the brake and switch levers on the automatic brake illustrated below. As the arm moves toward the center of the record, the trip rod swings these two levers and the brake-latch trip anti-clockwise. As the needle nears the end of the record, the brake-latch trip engages with the toothed edge of the latch plate, as shown. When the record is finished, the needle runs into an eccentric groove that swings the pick-up arm *away* from the center of the record. This movement pushes the trip against the latch plate, and frees the latch from the hand lever at point "A." This opens the A. C. switch and throws the friction leather against the inside edge of the turntable, thus stopping the motor and turntable.

ADJUSTMENTS

(1) If the latch does not trip, or trips before completion of a record, bend the hand-lever stop slightly to the right or left, as necessary.

(2) If the latch trip does not engage correctly with the latch-plate, loosen the two latch-plate screws and shift the plate one way or the other, as necessary. Re-tighten the screws. Remove any burrs from the teeth of the latch plate with fine emery paper.

(3) If the electric switch does not make and break contact when the hand-lever is turned on and off, it may be necessary to bend the long contact spring, or loosen the two switch screws and move the switch until the correct position is found. In the off position, there should be at least $\frac{1}{16}''$ gap between the contact points.

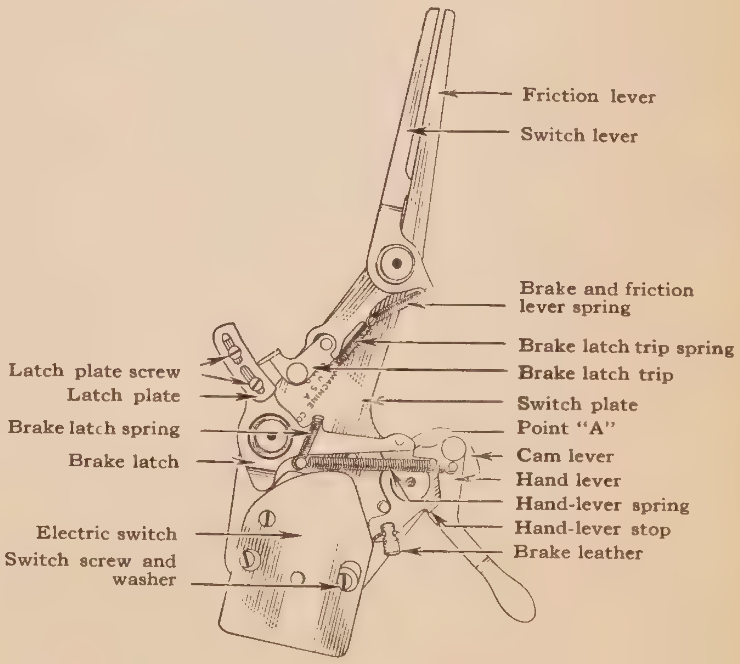
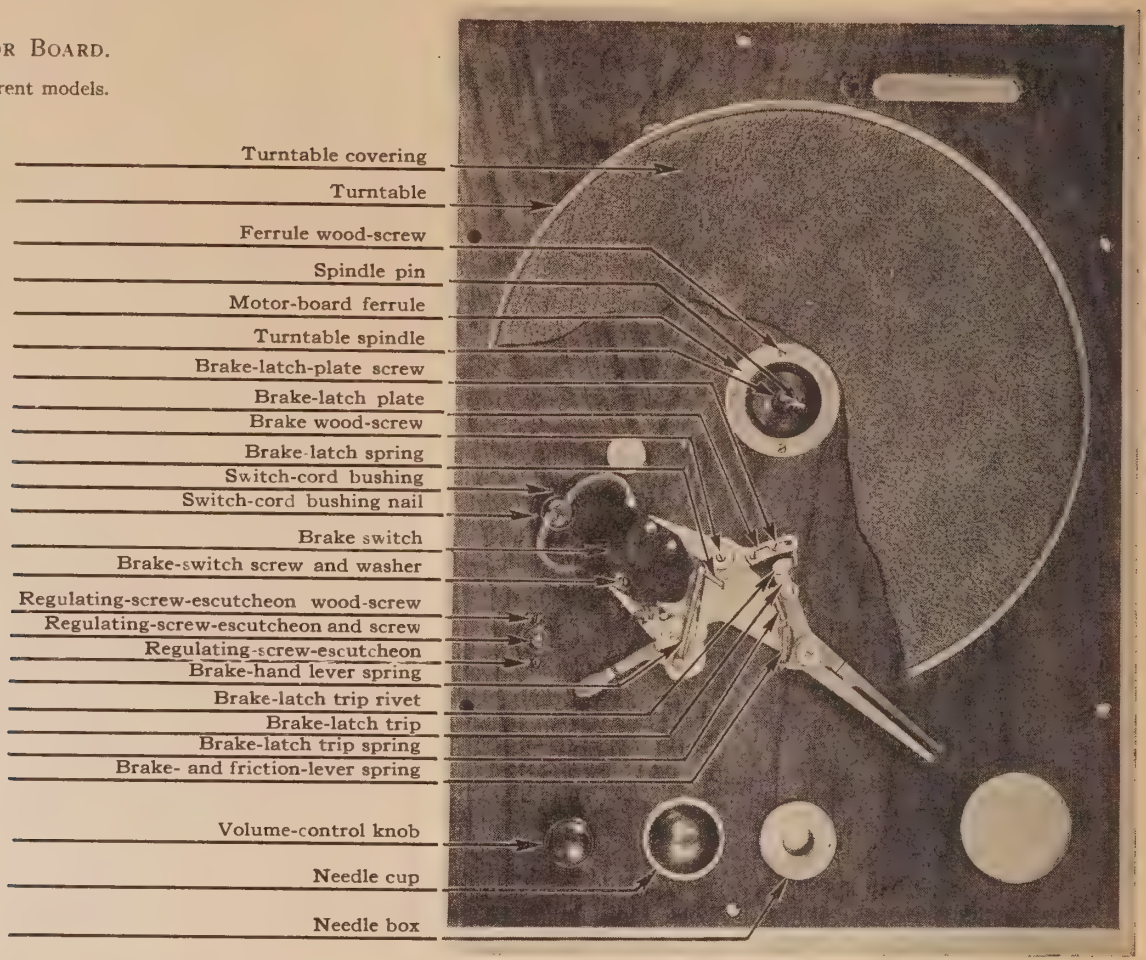

Friction lever
Switch lever
Brake and friction lever spring
Brake latch trip spring
Brake latch trip
Switch plate
Point "A"
Cam lever
Hand lever
Hand-lever spring
Hand-lever stop
Brake leather
Latch plate screw
Latch plate
Brake latch spring
Brake latch
Electric switch
Switch screw and washer

Fig. 238. Detailed View of the Automatic Switch and Brake.

PHONOGRAPH MOTOR BOARD

Fig. 239. Top View of Motor Board.

The slot in the board is not used in current models.


Turntable covering
Turntable
Ferrule wood-screw
Spindle pin
Motor-board ferrule
Turntable spindle
Brake-latch-plate screw
Brake-latch plate
Brake wood-screw
Brake-latch spring
Switch-cord bushing
Switch-cord bushing nail
Brake switch
Brake-switch screw and washer
Regulating-screw-escutcheon wood-screw
Regulating-screw-escutcheon and screw
Regulating-screw-escutcheon
Brake-hand lever spring
Brake-latch trip rivet
Brake-latch trip
Brake-latch trip spring
Brake- and friction-lever spring
Volume-control knob
Needle cup
Needle box

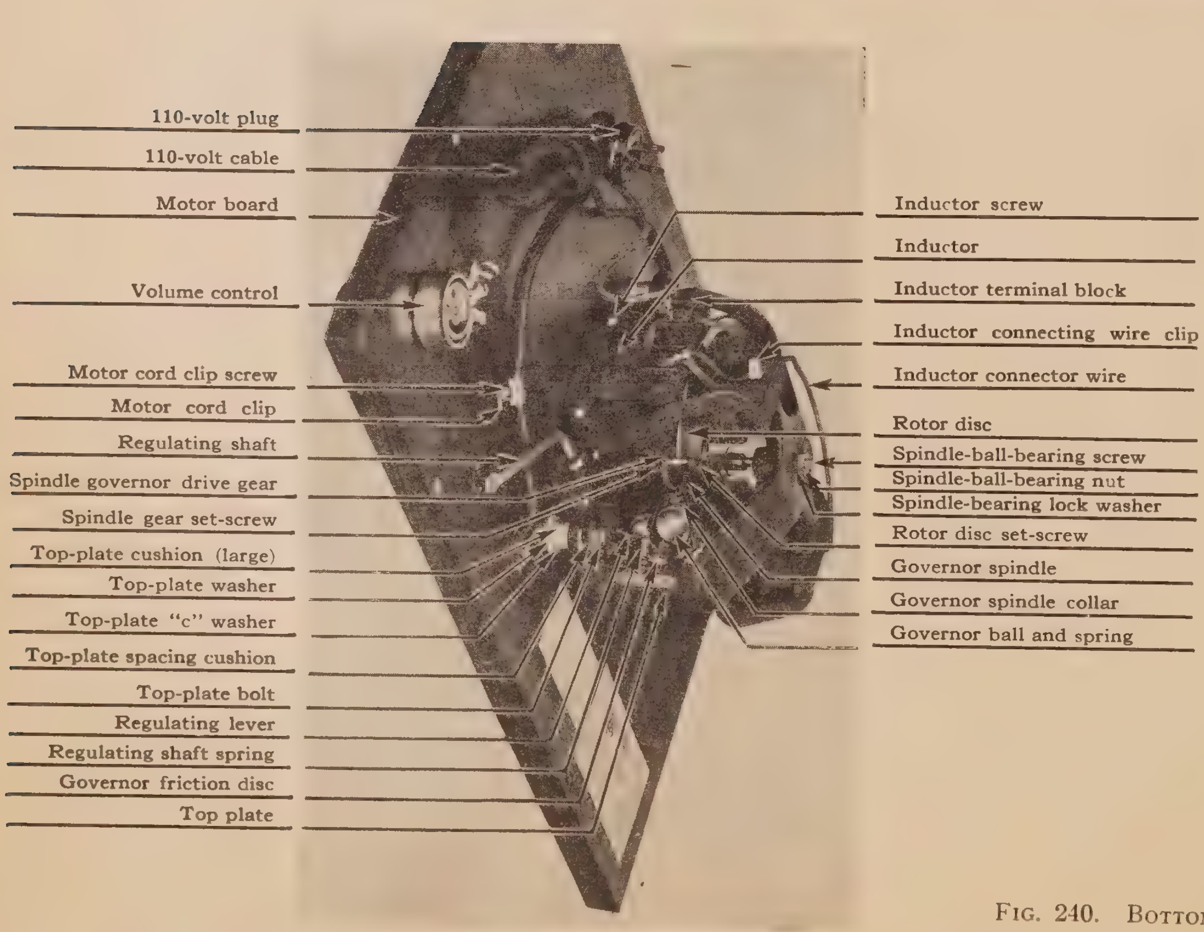

110-volt plug
110-volt cable
Motor board
Volume control
Motor cord clip screw
Motor cord clip
Regulating shaft
Spindle governor drive gear
Spindle gear set-screw
Top-plate cushion (large)
Top-plate washer
Top-plate "c" washer
Top-plate spacing cushion
Top-plate bolt
Regulating lever
Regulating shaft spring
Governor friction disc
Top plate
Inductor screw
Inductor
Inductor terminal block
Inductor connecting wire clip
Inductor connector wire
Rotor disc
Spindle-ball-bearing screw
Spindle-ball-bearing nut
Spindle-bearing lock washer
Rotor disc set-screw
Governor spindle
Governor spindle collar
Governor ball and spring

Fig. 240. Bottom View of Motor Board.

PARTS AND PRICE LIST — MODEL 75
PHONOGRAPH PARTS

Part No.	PICK-UP UNIT	Price
19056	Pick-up unit, complete, less arm	$12.50
19057	Pick-up coil	.50
19101	Pick-up-coil insulator	.05/doz.
19061	Pick-up magnet	2.60
19094	Pick-up-magnet spring (flat)	.10/doz.
19059	Pick-up pole piece (left-hand)	.40
19065	Pick-up pole piece (right-hand)	.40
19095	Pick-up-pole-piece nut	.12/doz.
19058	Pick-up armature	.30
19358	Armature spacing cushion	.12/doz.
19066	Pick-up needle screw	.08
19365	Damper plate	.10
19387	Damper-plate screw	.14/doz.
19364	Pick-up rubber damper	.06
19063	Pick-up cover	.50
19093	Pick-up-cover screw	.03
19102	Pick-up-unit back	.50
19096	Pick-up mounting screw	.02
19098	Pick-up mounting lock-washer	.06/doz.
19097	Pick-up mounting nut	.04

Part No.	PICK-UP ARM AND BASE	Price
19068	Pick-up arm and base, less unit	$ 5.50
19067	Pick-up connector block and wire	1.10
19069	Pick-up-arm trip rod and nut	.04
19092	Pick-up-arm trip-rod nut	.01
19099	Pick-up-arm wood-screw	.20/doz.
19087	PICK-UP INPUT TRANSFORMER	5.50
19353	Transformer leads	.30

Part No.	VOLUME CONTROL	Price
19077	Volume control, complete, less knob	$ 1.40
19079	Volume-control knob	.30
19146	Volume-control-knob set-screw	.06/doz.
19141	Volume-control connection screw	.06/doz.
19138	Volume-control washer	.12/doz.
19139	Volume-control nut	.08
19078	Volume-control cord	.25

Part No.	INDUCTION DISC MOTOR	Price
19071	60-cycle motor	$36.50
19073	60-cycle inductor	10.00
19104	Inductor terminal block	.20
19103	Inductor screw	.25/doz.
19106	Inductor connector wire	.20
19105	Inductor-connector-wire clip	.08/doz.
19072	Rotor disc	4.00
19109	Rotor-disc set-screw	.15/doz.

Part No.	GOVERNOR	Price
19074	Governor, complete	$ 2.50
19111	Governor spindle	.75
19112	Governor-spindle collar	.20
19113	Governor-spindle-collar set-screw	.12/doz.
19075	Governor ball and spring	.10
19115	Governor-ball-and-spring washer	.03/doz.
19114	Governor-ball-and-spring screw	.12/doz.
19121	Governor friction	.75
19076	Governor bearing	.03
19116	Governor bearing (grooved)	.03
19117	Governor-bearing ball	.01
19118	Governor-bearing set-screw	.12/doz.

Part No.	TURNTABLE SPINDLE	Price
19164	Turntable spindle	$ .75
19166	Turntable-spindle pin	.02
19082	Turntable-spindle ball-bearing	.01
19086	Turntable-spindle ball-bearing screw	.36/doz.
19108	Turntable-spindle ball-bearing lock-washer	.02
19107	Turntable-spindle ball-bearing nut	.01
19133	Turntable-spindle governor drive gear	.30
19109	Governor-drive-gear set-screw	.15/doz.

Part No.	SPEED REGULATOR	Price
19134	Regulating shaft	$ .12
19122	Regulating-shaft spring	.02
19123	Regulating lever	.15
19125	Regulating-lever leather	.01
19124	Regulating-lever set-screw	.02
19153	Regulating-screw escutcheon and screw	.23
19154	Escutcheon wood screw	.12/doz.

Part No.	BRAKE	Price
19145	Brake, complete	$ 3.40
19081	Brake switch	1.50
19155	Brake-switch screw	.02
19156	Brake-switch washer	.04
19161	Brake wood-screw	.10/doz.
19158	Brake-switch-cord bushing	.12
19157	Brake-switch-bushing nail	.08/doz.
19152	Brake hand-lever spring	.05
19147	Brake and friction lever spring	.05
19149	Brake-latch trip	.20
19151	Brake-latch-trip rivet	.02
19148	Brake-latch-trip spring	.06
19162	Brake-latch plate	.06
19163	Brake-latch-plate screw	.08/doz.
19159	Brake-latch spring	.06

Part No.	TOP PLATE	Price
19119	Top plate	$ 5.00
19126	Top-plate bolt	.10
19131	Top-plate bolt "C" washer	.03
19107	Top-plate nut	.01
19085	Top plate-washer	.01
19128	Top-plate lock-washer	.10/doz.
19127	Top-plate spacing cushion	.06
19143	Top-plate rubber cushion (small)	.06

Part No.	MISCELLANEOUS	Price
19135	Motor-cord clip	$ .04
19136	Motor-cord-clip wood-screw	.04/doz.
19137	Motor-cord eyelet	.16/doz.
19144	Motor-cord outlet	.60
19168	Turntable (with covering)	4.00
19169	Turntable covering	1.50
19083	Needle box	.30
19084	Needle cup	.15
19165	Motor-board ferrule	.10
19167	Motor-board-ferrule wood-screw	.08/doz.
19359	Light grease (can)	.25
19361	Heavy grease (tube)	.25
19362	Stroboscope disc	.05
19354	Speed tag	.01
19355	60-cycle tag	.01

December, 1930. These prices supersede all previous prices and are subject to change without notice.

Tabulated Service Data for Phonograph

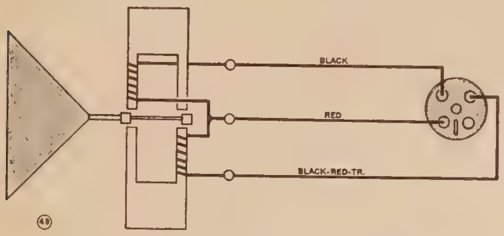
Important. It is advisable for the dealer to inspect and adjust radio-phonograph combinations at least twice a year. Clean off the old grease, put fresh grease and oil on the bearings, and regulate the motor speed to 78 revolutions per minute. If necessary, install a new rubber damper and armature spacing cushions in the pick-up. Tighten all screws and bolts. Finally, check over the radio set and tubes.

TROUBLE	PROBABLE CAUSE
No reproduction.	Defective volume control, input transformer, or pick-up coil.
Weak reproduction.	Weak magnet, shorted pick-up coil, or armature off center.
Distortion.	Loose or worn needle, defective rubber damper or armature spacing cushions, dirt in magnet gap, or needle screw touching pick-up cover.
Motor fails to operate.	Defective automatic switch, wrong or open connections in motor circuit, defective inductor, or jammed motor.
Irregular speed.	Poor lubrication, defective governor, improperly mounted motor, weak inductor, worn bearings.
60-cycle hum.	Loose inductor coils (use wedges to tighten) or loose laminations in inductor cores (tighten bolts).
Wabbling turntable.	Bent turntable spindle.
Noise.	Bent rotor disc-touching inductors, broken governor springs, defective or improperly lubricated gears or bearings, or bent governor spindle.

TYPE Q CHASSIS, VOLTAGE TABLE AND DIAGRAM

Type Q Chassis (battery operated) has three stages of screen-grid R. F. amplification, grid detection, one stage of transformer-coupled audio, and a double-audio output stage.

An output filter choke and condenser are used in the Q-2 (above Serial No. 5704025), as shown in the diagram below. The Q-1 Chassis does not have these two parts.


BLACK
RED
BLACK-RED-TR.
48

Connections of Inductor Type J Speaker.

VOLTAGE TABLE FOR TYPE Q CHASSIS

Set in operation. Volume control at maximum.
L-D switch at distance.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

180 VOLTS "B" BATTERY

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	3.3	135	1.5	45
2nd-R.F.	3.3	135	1.5	45
3rd-R.F.	3.3	135	2.5	45
Detector	5.0	70	—	—
1st-A.F.	5.0	67	45	—
2A	5.0	180	45	—
2Aa	5.0	180	45	—

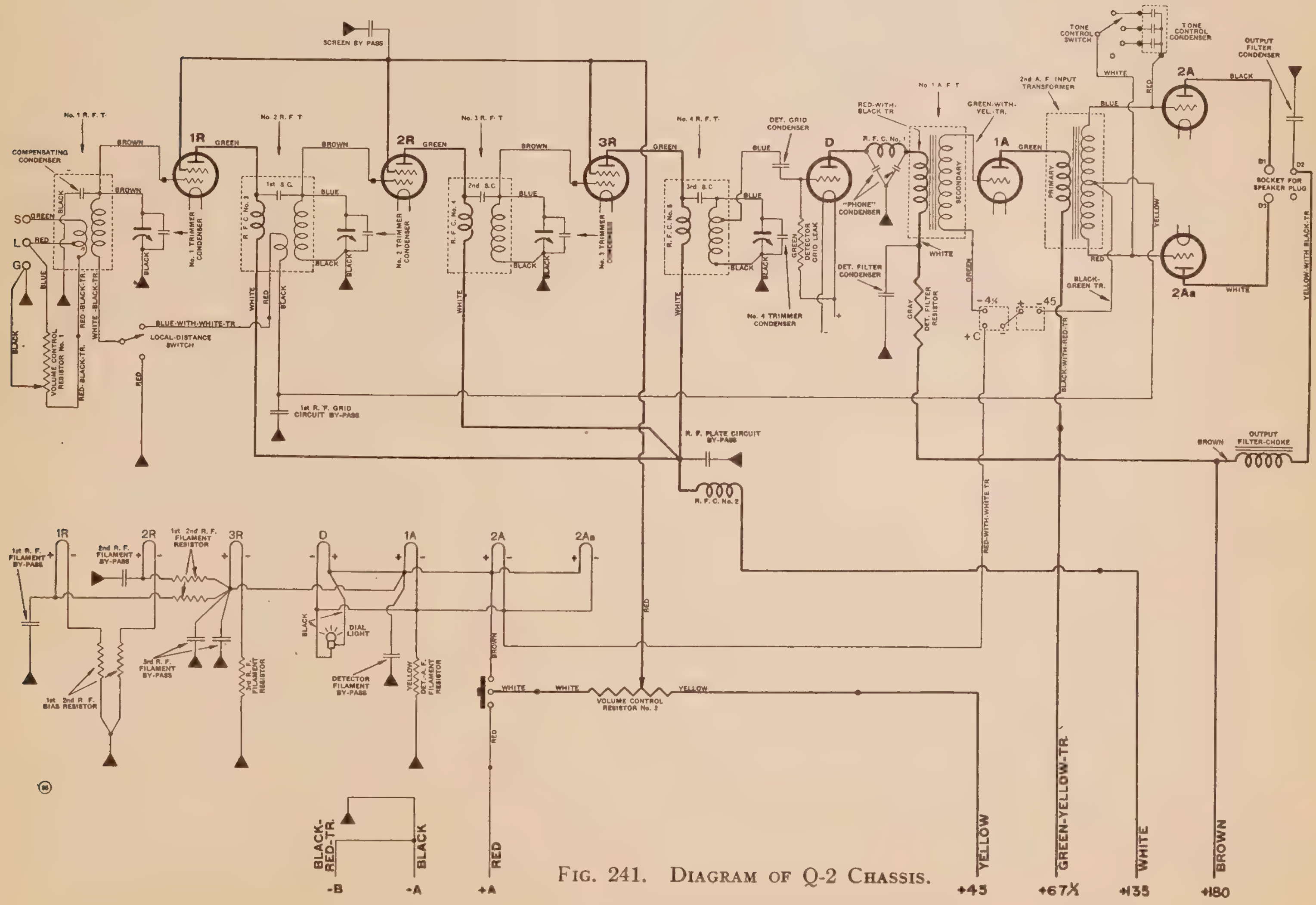

SCREEN BY PASS
No. 1 R. F. T.
No. 2 R. F. T
No. 3 R. F. T
No. 4 R. F. T.
COMPENSATING CONDENSER
S
L
G
GREEN
RED
BLUE
BLACK
BROWN
1R
2R
3R
1st S.C.
2nd S.C.
3rd S.C.
No. 1 TRIMMER CONDENSER
No. 2 TRIMMER CONDENSER
No. 3 TRIMMER CONDENSER
No. 4 TRIMMER CONDENSER
R F C No. 3
R F C No. 4
R. F. C. No. 5
VOLUME CONTROL RESISTOR No. 1
RED-BLACK-TR.
WHITE-BLACK-TR.
BLUE-WITH-WHITE-TR
LOCAL-DISTANCE SWITCH
WHITE
1st R. F. GRID CIRCUIT BY-PASS
DET. GRID CONDENSER
D
R. F. C. No. 1
"PHONE" CONDENSER
DETECTOR GRID LEAK
RED-WITH-BLACK TR
No. 1 A. F. T
GREEN-WITH-YEL.-TR.
SECONDARY
1A
2nd A. F. INPUT TRANSFORMER
PRIMARY
TONE CONTROL SWITCH
TONE CONTROL CONDENSER
OUTPUT FILTER CONDENSER
2A
2Aa
SOCKET FOR SPEAKER PLUG
D1
D2
D3
YELLOW
YELLOW-WITH-BLACK-TR.
DET. FILTER CONDENSER
GRAY
DET. FILTER RESISTOR
BLACK-GREEN TR.
-4½
+
-45
+C
BLACK-WITH-RED-TR
R. F. PLATE CIRCUIT BY-PASS
R. F. C. No. 2
OUTPUT FILTER-CHOKE
RED-WITH-WHITE TR
1st R. F. FILAMENT BY-PASS
2nd R. F. FILAMENT BY-PASS
1st 2nd R. F. FILAMENT RESISTOR
3rd R. F. FILAMENT BY-PASS
1st 2nd R. F. BIAS RESISTOR
3rd R. F. FILAMENT RESISTOR
DIAL LIGHT
DETECTOR FILAMENT BY-PASS
DET.-A. F. FILAMENT RESISTOR
VOLUME CONTROL RESISTOR No. 2
BLACK-RED-TR.
GREEN-YELLOW-TR.
-B
-A
+A
+45
+67½
+135
+180
86

Fig. 241. Diagram of Q-2 Chassis.

The output filter choke and filter condenser are used only in Type Q-2 Chassis. The choke is mounted in the 2nd-A. F. input transformer container. Type Q-1 Chassis may be converted to Q-2 by installing this unit (No. 18020) and connecting it as shown above and on Page 243.

December, 1930.

TYPE Q CHASSIS RECEIVER

R.F. By-Pass No. 1

G—R.F. screen by-pass.
V—1st-R.F. grid-circuit by-pass.
Y—Output filter condenser.
N—1st-R.F. filament by-pass.

R.F. By-Pass No. 2*

H—R.F. plate-circuit by-pass.
T—Detector filter condenser.
P—"Phone" condenser.
P—"Phone" condenser.

R.F. By-Pass No. 3

S—Detector filament by-pass.
R—3rd-R.F. filament by-pass.
R—3rd-R.F. filament by-pass.
O—2nd-R.F. filament by-pass.

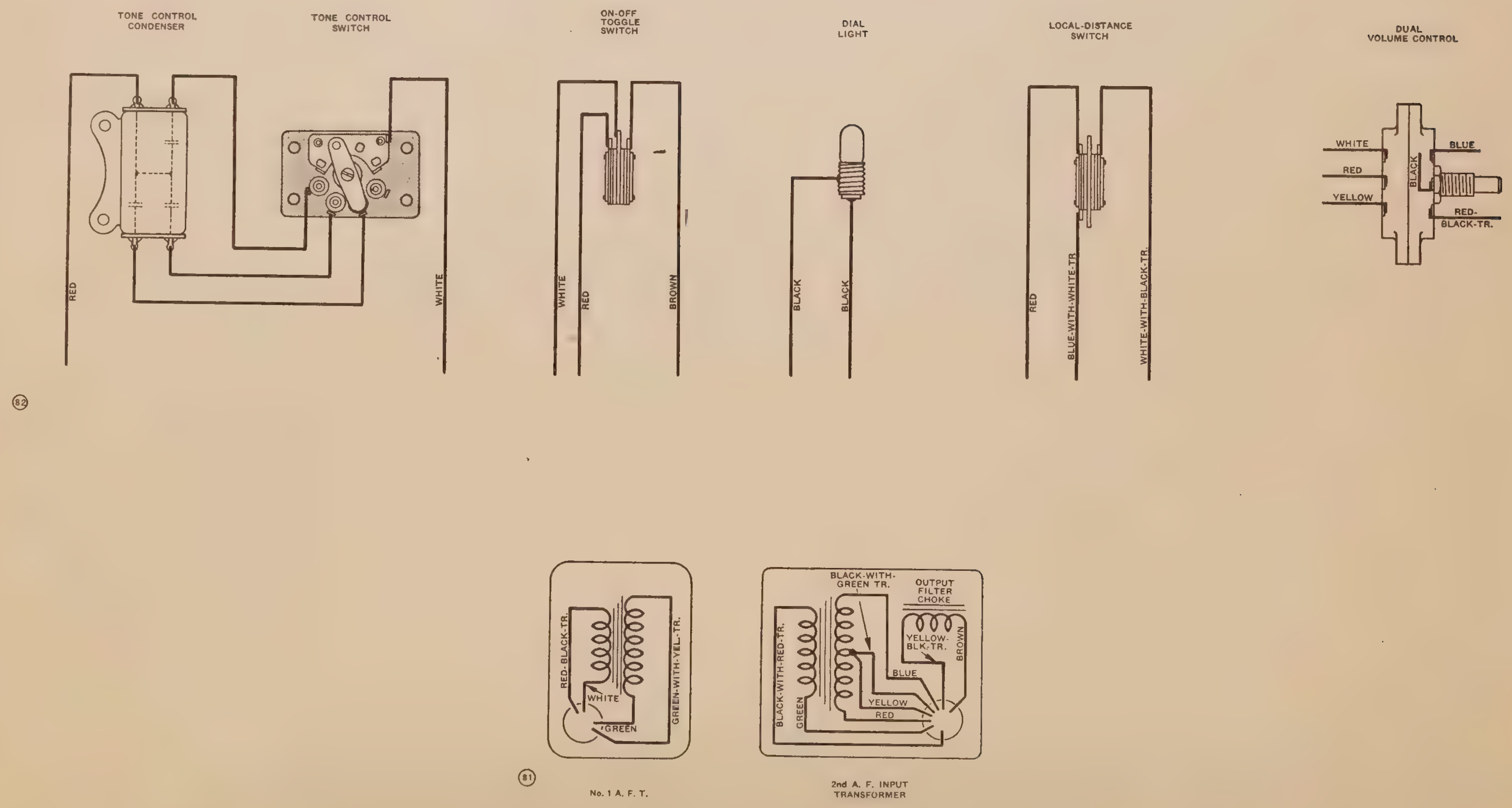

TONE CONTROL CONDENSER
TONE CONTROL SWITCH
ON-OFF TOGGLE SWITCH
DIAL LIGHT
LOCAL-DISTANCE SWITCH
DUAL VOLUME CONTROL
RED
WHITE
WHITE
RED
BROWN
BLACK
BLACK
RED
BLUE-WITH-WHITE-TR.
WHITE-WITH-BLACK-TR.
WHITE
RED
YELLOW
BLACK
BLUE
RED-BLACK-TR.
(82)
RED-BLACK-TR.
WHITE
GREEN
GREEN-WITH-YEL-TR.
BLACK-WITH-GREEN TR.
OUTPUT FILTER CHOKE
YELLOW-BLK-TR.
BROWN
BLUE
YELLOW
RED
BLACK-WITH-RED-TR.
GREEN
(81)
No. 1 A. F. T.
2nd A. F. INPUT TRANSFORMER

FIG. 242. CONNECTIONS OF UNITS IN Q-1 AND Q-2 CHASSIS.

The output filter choke is not used in the Q-1 chassis.

*The connections shown in Fig. 243 for R. F. by-pass No. 2 are correct when this part is No. 16060 (H-24). However, if a No. 18350 (H-28) is used, "P" and "P" are at top, and "H" and "T" are at bottom; therefore, the connections to this condenser are correspondingly changed.

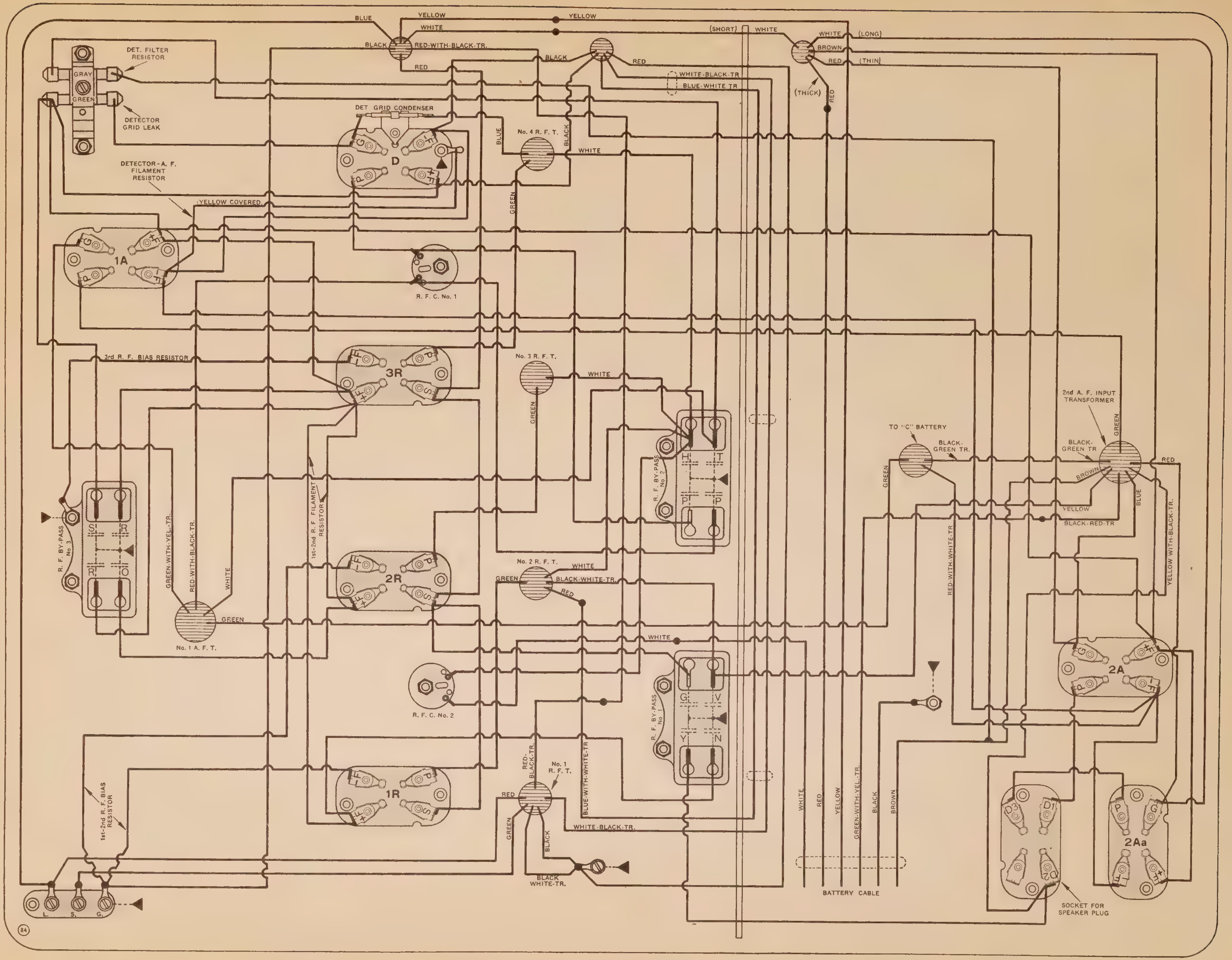

BLUE
YELLOW
WHITE
BLACK
RED-WITH-BLACK-TR.
RED
(SHORT)
(LONG)
BROWN
(THIN)
(THICK)
WHITE-BLACK-TR
BLUE-WHITE TR
DET. FILTER RESISTOR
GRAY
GREEN
DETECTOR GRID LEAK
DET GRID CONDENSER
D
No. 4 R. F. T.
DETECTOR-A. F. FILAMENT RESISTOR
YELLOW COVERED
1A
R. F. C. No. 1
3rd R. F. BIAS RESISTOR
3R
No. 3 R. F. T.
R. F. BY-PASS No. 2
H
T
P
1st-2nd R. F. FILAMENT RESISTOR
R. F. BY-PASS No. 3
S
R
O
GREEN-WITH-YEL.-TR.
RED-WITH-BLACK-TR.
2R
No. 2 R. F. T.
BLACK-WHITE-TR.
No. 1 A. F. T.
R. F. C. No. 2
R. F. BY-PASS No. 1
G
V
Y
N
1R
No. 1 R. F. T.
RED-BLACK-TR.
BLUE-WITH-WHITE-TR.
WHITE-BLACK-TR.
BLACK WHITE-TR.
1st-2nd R. F. BIAS RESISTOR
L.
S.
G.
TO "C" BATTERY
BLACK-GREEN TR.
RED-WITH-WHITE-TR
2nd A. F. INPUT TRANSFORMER
YELLOW-WITH-BLACK-TR.
BLACK-RED-TR
2A
BATTERY CABLE
GREEN-WITH-YEL.-TR.
D1
D2
D3
2Aa
SOCKET FOR SPEAKER PLUG
84

Fig. 243. Bottom Wiring of Type Q-2 Chassis.

IMPORTANT. The connections of R. F. by-pass No. 2 are shown correctly when this condenser is Part No. 16060, Code H-24. If this condenser is No. 18350, Code H-28, P and P are at the top, and H and T are at the bottom, and the leads to this condenser are correspondingly changed.

PARTS AND PRICE LIST—TYPE Q, No. 16800, CHASSIS

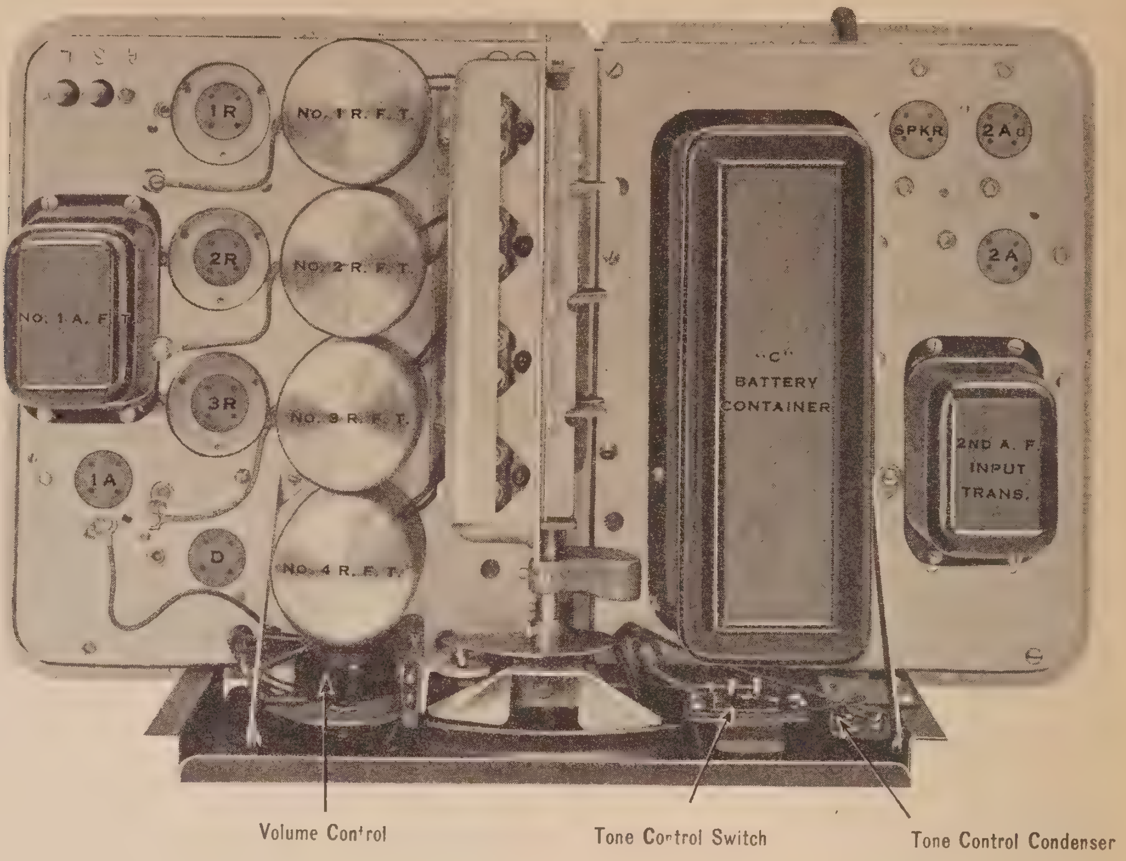


Fig. 244.
Top View of Type Q Chassis.

FRONT PANEL ASSEMBLY

Part No.		Price
18085	Front panel with dial plate	$1.25
18581	Front panel complete	2.50
17985	Escutcheon	1.00
17224	Front panel brace (2 used)	.10
17244	Volume-control or tone-control knob	.30
17814	Dial knob	.30
16770	On-off switch	1.60
16760	Local-distance switch	1.25
16010	Volume-control (less bracket)	5.25
18259	Volume-control bracket	.20
18223	Tone-control condenser clamp	.05
17959	Dial pointer	.05
16430	TONE-CONTROL SWITCH COMPLETE	.75
18148	Base	.60
18146	Shaft	.12
18112	Contact blade	.03

Part No.		Price
18579	VARIABLE-CONDENSER STATOR, ROTOR AND FRAME (with leads and balance weight)	$9.60
18615	Dial gear	.40
17962	Pointer control arm	.30
17961	Dial-rubber assembly	.15
17941	Dial-knob shaft	.05
16420	Dial-light socket and reflector, one-hole mounting (less leads)	.40
16420-A	Dial-light socket and reflector, two-hole mounting (less leads)	.40
17936	Dial-knob bracket (one-hole mounting)	.35
18144	Dial-knob bracket (two-hole mounting)	.35
17935	Dial-knob bracket support (threaded)	.03
17107	Rotor-connection (long)	.10
17291	Rotor-connection (short)	.10
16099	Dial light	.25

No separate parts, except those listed above, will be supplied for the variable-condenser unit.

AUDIO TRANSFORMERS

Part No.		Price
15960	No. 1 A. F. transformer	$4.00
18020	No. 2 A. F. transformer (18020 supersedes No. 15970)	5.25
15978	"C" battery container	1.30
16103	"C" battery container lid	.50
16104	Connection card	.06

COIL GROUP

Part No.		Price
17510	R. F. coil group	$4.00
16360	Stopping condenser (3 used)	.10
16360	Compensating condenser (1 used)	.10
17295	R. F. coil shield (4 used)	.50

If one R. F. coil, or R. F. C. No. 3, No. 4, or No. 5, is defective, the ENTIRE coil group must be replaced.

December, 1930. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE Q, No. 16800, CHASSIS

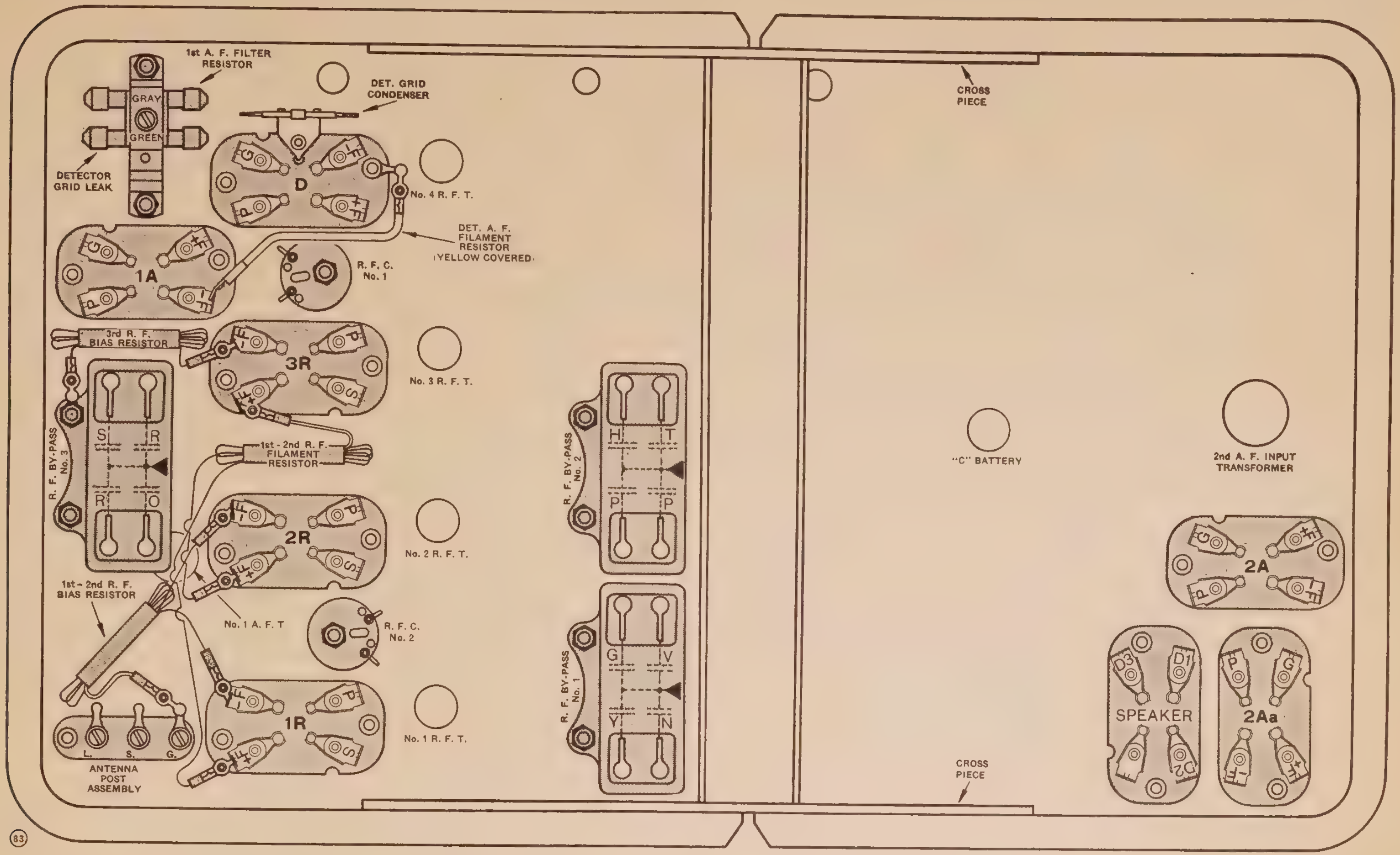

1st A. F. FILTER RESISTOR
GRAY
GREEN
DETECTOR GRID LEAK
DET. GRID CONDENSER
D
No. 4 R. F. T.
DET. A. F. FILAMENT RESISTOR (YELLOW COVERED)
R. F. C. No. 1
1A
3rd R. F. BIAS RESISTOR
3R
No. 3 R. F. T.
R. F. BY-PASS No. 3
S
R
R
O
1st - 2nd R. F. FILAMENT RESISTOR
2R
No. 2 R. F. T.
1st - 2nd R. F. BIAS RESISTOR
No. 1 A. F. T
R. F. C. No. 2
1R
No. 1 R. F. T.
L.
S.
G.
ANTENNA POST ASSEMBLY
R. F. BY-PASS No. 2
H
T
P
P
R. F. BY-PASS No. 1
G
V
Y
N
CROSS PIECE
"C" BATTERY
2nd A. F. INPUT TRANSFORMER
2A
SPEAKER
D1
D2
2Aa
CROSS PIECE
63

Fig. 245. Bottom View of Type Q Chassis.

TUBULAR RESISTORS

Part No.		Price
15285	Det. filter resistor (gray)	$ .50
15892	Detector grid-leak (green)	.25
17341	Resistor bracket	.05
17344	Fibre resistor pad	.25/c
17343	Metal clamping strip	.02

FLEXIBLE RESISTORS

Part No.		Price
16081	Detector-A.F. filament resistor	$ .15
16290	1st-2nd R.F. bias resistor (each leg 14″ long)	.20
16610	3rd-R.F. bias resistor	.20
16280	1st-2nd R.F. filament resistor (each leg 10″ long)	.20
15271-A	R. F. CHOKE NO. 1, No. 2	.25

SOCKETS

Part No.		Price
18417	1R, 2R, 3R tube sockets	$ .25
18418	D, 1A tube sockets	.25
18419	Detector tube socket, and grid cond. assembly	.65
18398	2A tube socket	.25
18399	2Aa tube socket	.25
17512	Speaker plug socket	.25
17377	Socket insulator (8 used)	.25/c

FIXED CONDENSERS

Part No.		Price
15262	R. F. by-pass No. 1	$1.00
18350	R. F. by-pass No. 2	1.10
15262	R. F. by-pass No. 3	1.00
15870	Tone control condenser	1.00
16088	Grid condenser	.20
18419	Grid condenser and det. socket assembly	.65

MISCELLANEOUS PARTS

(Screws, nuts, washers, and small parts—see page 229)

Part No.		Price
16165	Battery cable	$3.50
15739-A	Cable clamp	.02
17521	Antenna binding posts and base	.45
17323	Antenna and ground base	.05
8215	Binding post	.20
18493	Bottom plate	1.30
13989	Ground clamp	.30
15213	Tube-shield (3 used)	.15
15214	Tube-shield base (3 used)	.03
17326	Detector cap	.30
18117	Balance-weight for variable condenser	.35
18118	"Guide" card (form F-680)	.75/c net
18119	Log card (form F-681)	.75/c net
17223	Cross piece (10″ x ⅞″—2 used)	.25
17632	Detector cap lead (brown)	.10
	Trimmer-condenser sealing wax	.50 lb.
18114	Tuned-radio frequency name-plate	.06
15990	Literature assembly	.20 net
17885	Instruction book	.10 “
18485	Shipping container	.65 “

December, 1930. These prices supersede all previous prices and are subject to change without notice.

TYPE D-1 CHASSIS, VOLTAGE TABLE AND DIAGRAM

VOLTAGE TABLE FOR TYPE D CHASSIS

Set in operation. Volume control at maximum.
L-D switch at distance.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V. LINE

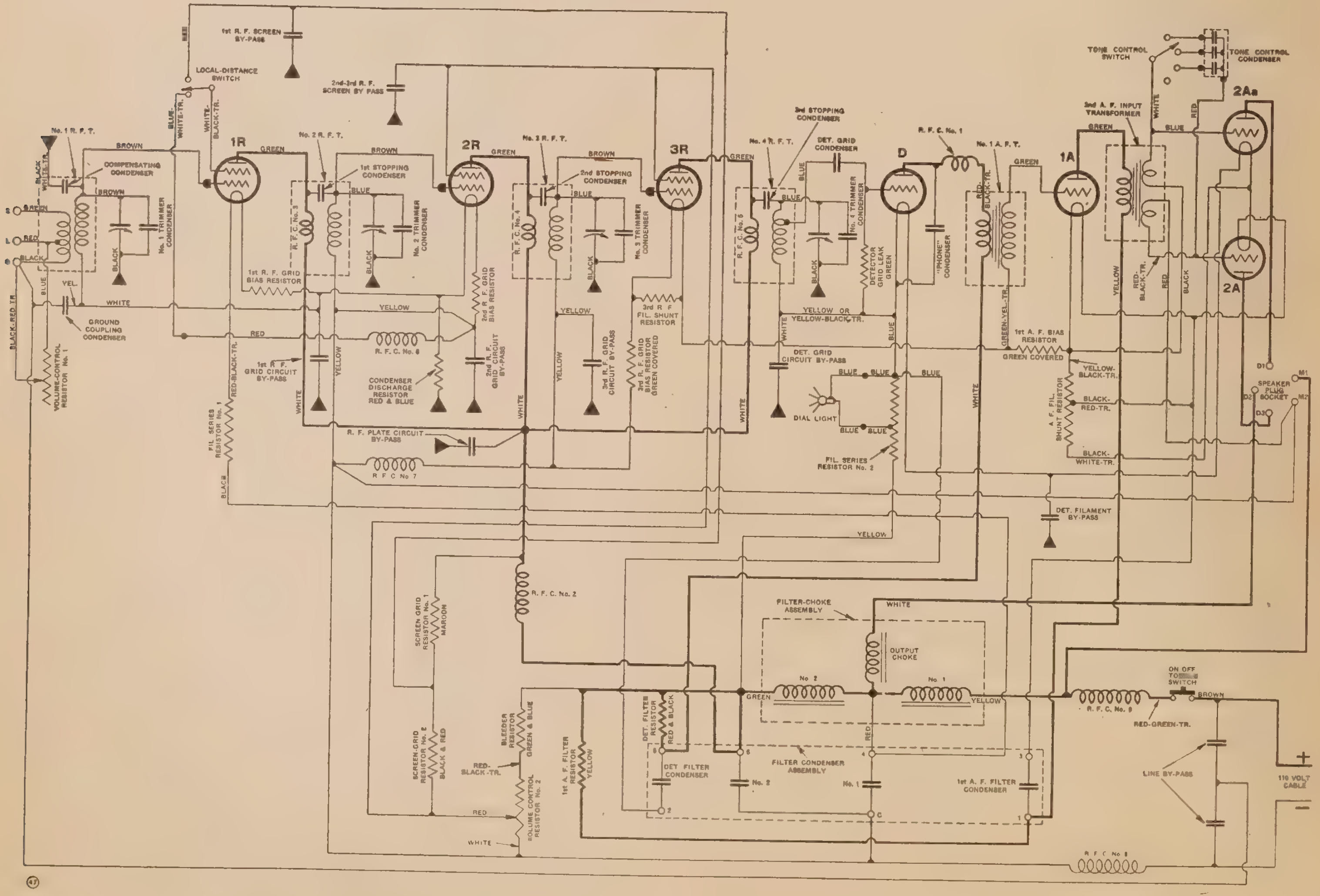
TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	3.3	75	4.2	60*
2nd-R.F.	3.3	75	1.3	50
3rd-R.F.	3.3	75	1	50
Detector	5	20	—	—
1st-A.F.	5	45	6	—
2A	5	75	10	—
2Aa	5	80	10	—

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.
Use 250-volt scale to measure 2nd A. F. grid voltage.
*This is 50 volts in D-2 chassis.

Type D Chassis (D. C. operated) has three stages of screen-grid R. F. amplification, detector, one stage of transformer—coupled A. F., and a "double-audio" output stage.

This set is designed for use with an electro-dynamic type N-3 speaker.

The early Type D Chassis is known as the D-1. A later modification is known as the D-2. For an explanation of the difference between these two types, see Page 249.



1st R. F. SCREEN BY-PASS
LOCAL-DISTANCE SWITCH
2nd-3rd R. F. SCREEN BY PASS
No. 1 R. F. T.
COMPENSATING CONDENSER
No. 1 TRIMMER CONDENSER
S
L
G
GROUND COUPLING CONDENSER
VOLUME-CONTROL RESISTOR No. 1
1R
No. 2 R. F. T.
1st STOPPING CONDENSER
R. F. C. No. 3
1st R. F. GRID BIAS RESISTOR
No. 2 TRIMMER CONDENSER
1st R. F. GRID CIRCUIT BY-PASS
FIL SERIES RESISTOR No. 1
R. F. C. No. 6
CONDENSER DISCHARGE RESISTOR RED & BLUE
2R
No. 3 R. F. T.
2nd STOPPING CONDENSER
R. F. C. No. 4
2nd R. F. GRID BIAS RESISTOR
2nd R. F. GRID CIRCUIT BY-PASS
No. 3 TRIMMER CONDENSER
3rd R. F. GRID CIRCUIT BY-PASS
3rd R F FIL. SHUNT RESISTOR
3rd R. F. GRID BIAS RESISTOR GREEN COVERED
R. F. PLATE CIRCUIT BY-PASS
R F C No 7
3R
No. 4 R. F. T.
3rd STOPPING CONDENSER
R. F. C. No. 5
DET. GRID CONDENSER
No. 4 TRIMMER CONDENSER
DETECTOR GRID LEAK GREEN
DET. GRID CIRCUIT BY-PASS
DIAL LIGHT
FIL. SERIES RESISTOR No. 2
D
R. F. C. No. 1
"PHONE" CONDENSER
No. 1 A. F. T.
1A
1st A. F. BIAS RESISTOR GREEN COVERED
A. F. FIL. SHUNT RESISTOR
DET. FILAMENT BY-PASS
TONE CONTROL SWITCH
TONE CONTROL CONDENSER
2nd A. F. INPUT TRANSFORMER
2Aa
2A
D1
D2
D3
M1
M2
SPEAKER PLUG SOCKET
R. F. C. No. 2
SCREEN GRID RESISTOR No. 1 MAROON
SCREEN-GRID RESISTOR No. 2 BLACK & RED
BLEEDER RESISTOR GREEN & BLUE
RED-BLACK-TR.
VOLUME CONTROL RESISTOR No. 2
1st A. F. FILTER RESISTOR YELLOW
DET. FILTER RESISTOR RED & BLACK
DET FILTER CONDENSER
FILTER-CHOKE ASSEMBLY
OUTPUT CHOKE
No 2
No. 1
FILTER CONDENSER ASSEMBLY
1st A. F. FILTER CONDENSER
ON OFF TO SWITCH
R. F. C. No. 9
RED-GREEN-TR.
LINE BY-PASS
R F C No 8
110 VOLT CABLE
+
—

FIG. 246. DIAGRAM OF D-1 CHASSIS.

TYPE D-2 CHASSIS

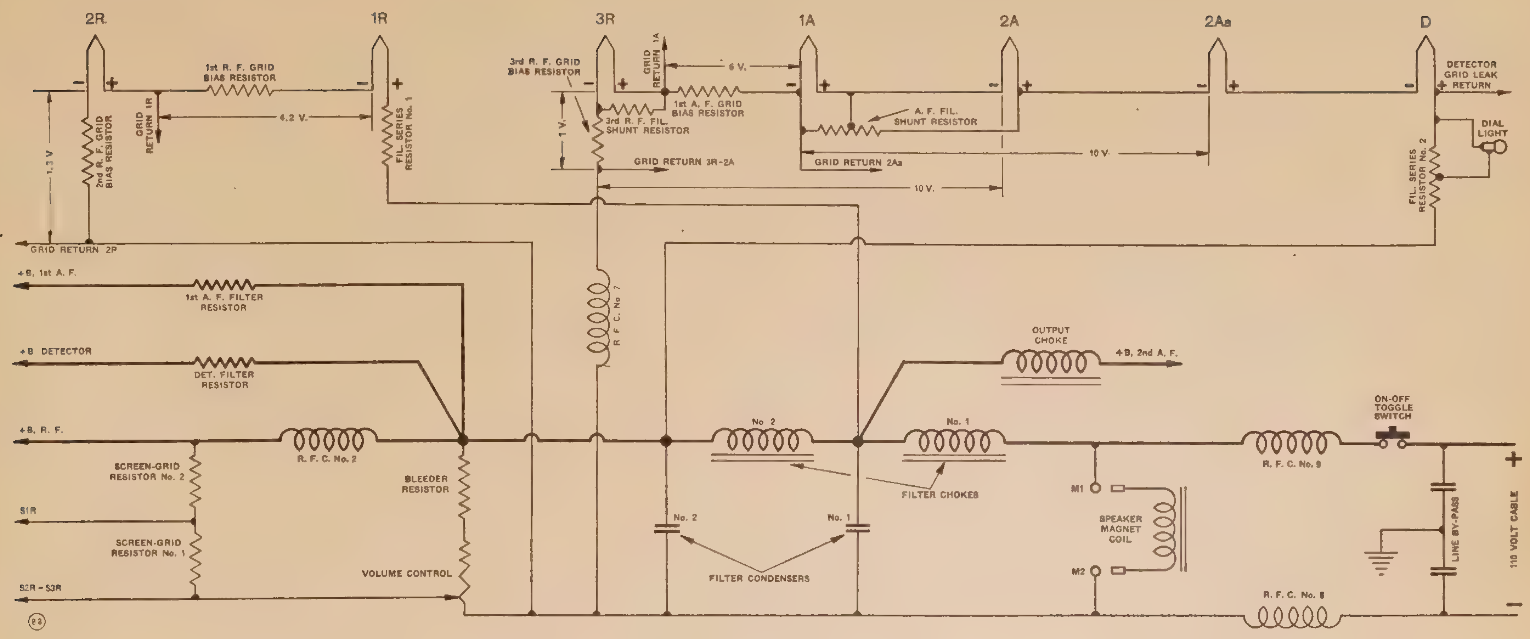

2R
1R
3R
1A
2A
2As
D
1st R. F. GRID BIAS RESISTOR
2nd R. F. GRID BIAS RESISTOR
GRID RETURN 1R
4.2 V.
1.3 V.
FIL. SERIES RESISTOR No. 1
3rd R. F. GRID BIAS RESISTOR
GRID RETURN 1A
6 V.
1st A. F. GRID BIAS RESISTOR
3rd R. F. FIL. SHUNT RESISTOR
1 V.
GRID RETURN 3R-2A
A. F. FIL. SHUNT RESISTOR
GRID RETURN 2As
10 V.
10 V.
DETECTOR GRID LEAK RETURN
DIAL LIGHT
FIL. SERIES RESISTOR No. 2
GRID RETURN 2P
+B, 1st A. F.
1st A. F. FILTER RESISTOR
R F C. No 7
+B DETECTOR
DET. FILTER RESISTOR
OUTPUT CHOKE
+B, 2nd A. F.
+B, R. F.
R. F. C. No. 2
No 2
No. 1
ON-OFF TOGGLE SWITCH
R. F. C. No. 9
+
SCREEN-GRID RESISTOR No. 2
BLEEDER RESISTOR
FILTER CHOKES
M1
SPEAKER MAGNET COIL
M2
LINE BY-PASS
110 VOLT CABLE
S1R
SCREEN-GRID RESISTOR No. 1
VOLUME CONTROL
No. 2
No. 1
FILTER CONDENSERS
S2R - S3R
R. F. C. No. 8
−
88

FIG. 247. SIMPLIFIED DIAGRAM OF POWER UNIT AND FILAMENT CIRCUIT IN TYPE D CHASSIS.

The grid bias voltage for any one tube is secured by bringing the grid-return lead of the tube to a point in the filament circuit that has the correct negative voltage with respect to the negative filament terminal of the same tube. This is clearly indicated in the above diagram.

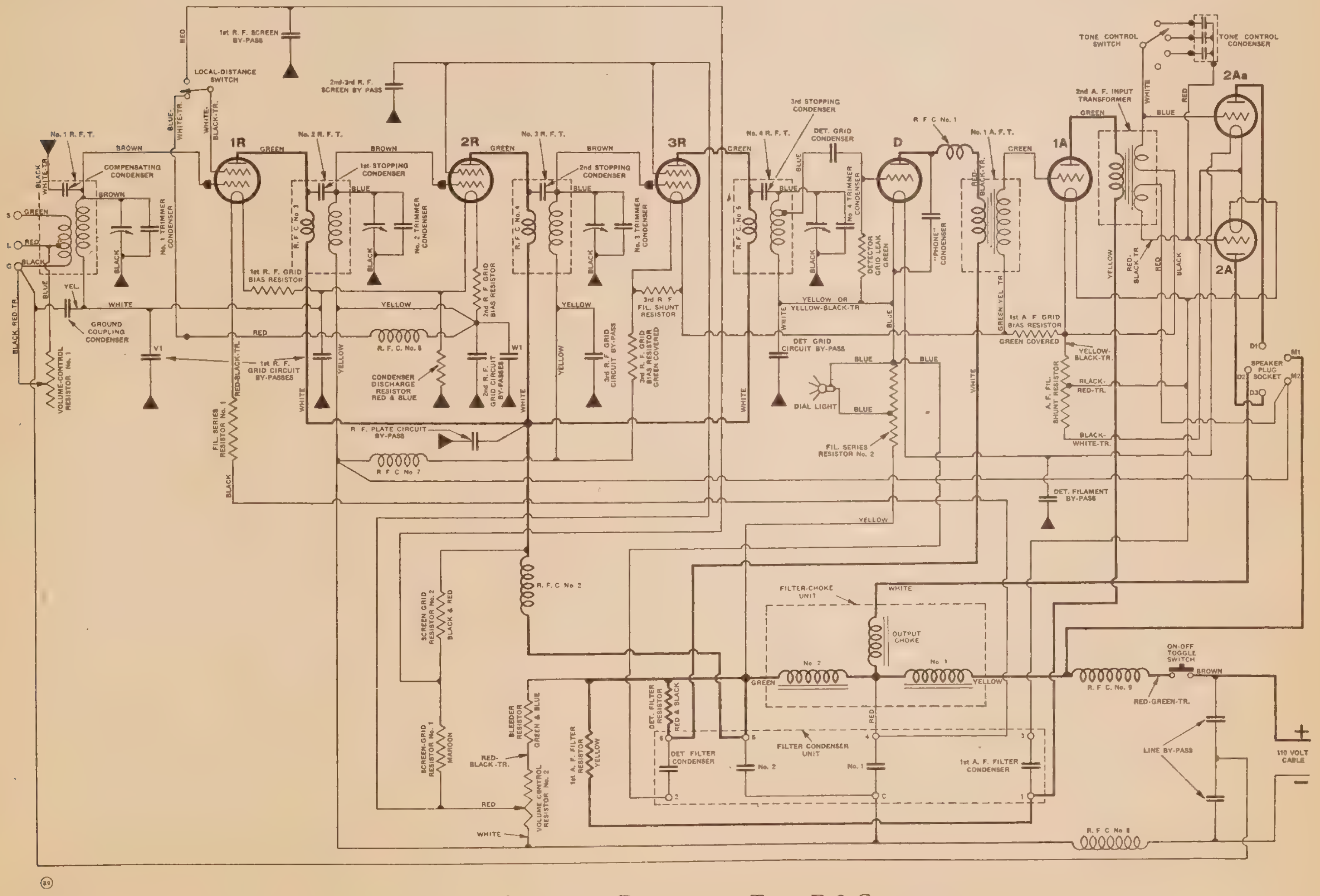

1st R. F. SCREEN BY-PASS
RED
LOCAL-DISTANCE SWITCH
2nd-3rd R. F. SCREEN BY PASS
No. 1 R. F. T.
BROWN
1R
GREEN
No. 2 R. F. T.
BROWN
2R
GREEN
No. 3 R. F. T.
BROWN
3R
GREEN
No. 4 R. F. T.
DET. GRID CONDENSER
D
R F C No. 1
No. 1 A. F. T.
1A
GREEN
2nd A. F. INPUT TRANSFORMER
TONE CONTROL SWITCH
TONE CONTROL CONDENSER
2As
2A
COMPENSATING CONDENSER
1st STOPPING CONDENSER
2nd STOPPING CONDENSER
3rd STOPPING CONDENSER
No. 1 TRIMMER CONDENSER
No. 2 TRIMMER CONDENSER
No. 1 TRIMMER CONDENSER
No. 4 TRIMMER CONDENSER
DETECTOR GRID LEAK GREEN
"PHONE" CONDENSER
R. F. C. No. 3
R. F. C. No. 4
R. F. C. No. 5
S
L
G
GREEN
RED
BLACK
BLUE
YEL.
WHITE
GROUND COUPLING CONDENSER
BLACK RED TR.
VOLUME-CONTROL RESISTOR No. 1
V1
1st R. F. GRID BIAS RESISTOR
1st R. F. GRID CIRCUIT BY-PASSES
YELLOW
R. F. C. No. 6
CONDENSER DISCHARGE RESISTOR RED & BLUE
2nd R. F. GRID BIAS RESISTOR
2nd R. F. GRID CIRCUIT BY-PASSES
W1
3rd R. F. FIL. SHUNT RESISTOR
3rd R. F. GRID CIRCUIT BY-PASS
3rd R. F. GRID BIAS RESISTOR GREEN COVERED
YELLOW OR YELLOW-BLACK-TR
DET GRID CIRCUIT BY-PASS
DIAL LIGHT
FIL. SERIES RESISTOR No. 2
1st A. F. GRID BIAS RESISTOR GREEN COVERED
A. F. FIL. SHUNT RESISTOR
YELLOW-BLACK-TR.
BLACK-RED-TR.
BLACK-WHITE-TR.
SPEAKER PLUG SOCKET
D1
D2
D3
M1
M2
DET. FILAMENT BY-PASS
FIL. SERIES RESISTOR No. 1
R. F. PLATE CIRCUIT BY-PASS
R F C No 7
R. F. C No 2
SCREEN GRID RESISTOR No. 2 BLACK & RED
FILTER-CHOKE UNIT
WHITE
OUTPUT CHOKE
No 2
No. 1
GREEN
YELLOW
ON-OFF TOGGLE SWITCH
R. F. C. No. 9
BROWN
RED-GREEN-TR.
SCREEN-GRID RESISTOR No. 1 MAROON
RED-BLACK-TR.
BLEEDER RESISTOR GREEN & BLUE
VOLUME CONTROL RESISTOR No. 2
RED
WHITE
1st A. F. FILTER RESISTOR YELLOW
DET. FILTER RESISTOR RED & BLACK
DET FILTER CONDENSER
FILTER CONDENSER UNIT
No. 2
No. 1
1st A. F. FILTER CONDENSER
LINE BY-PASS
110 VOLT CABLE
+
−
R. F. C No 8
89

FIG. 248. SCHEMATIC DIAGRAM OF TYPE D-2 CHASSIS.

Note the addition of by-pass condensers V-1 and W-1 and the reversal of screen-grid resistors No. 1 and No. 2.

TYPE D CHASSIS RECEIVER

Condensers in R.F. By-Pass No. 1

L—Line by-pass.
L—Line by-pass.
U—Ground coupling condenser.

Condensers in R.F. By-Pass No. 2

E—1st-R.F. screen by-pass.
F—2nd-3rd-R.F. screen by-pass.
V_1—1st-R.F. grid-circuit by-pass.
W_1—2nd-R.F. grid-circuit by-pass.

Condensers in R.F. By-Pass No. 3

H—R.F. plate-circuit by-pass.
S—Detector filament by-pass.
P—"Phone" condenser.

Condensers in R.F. By-Pass No. 4

D—Detector grid-circuit by-pass.
V—1st-R.F. grid-circuit by-pass.
W—2nd-R.F. grid-circuit by-pass.
X—3rd-R.F. grid-circuit by-pass.

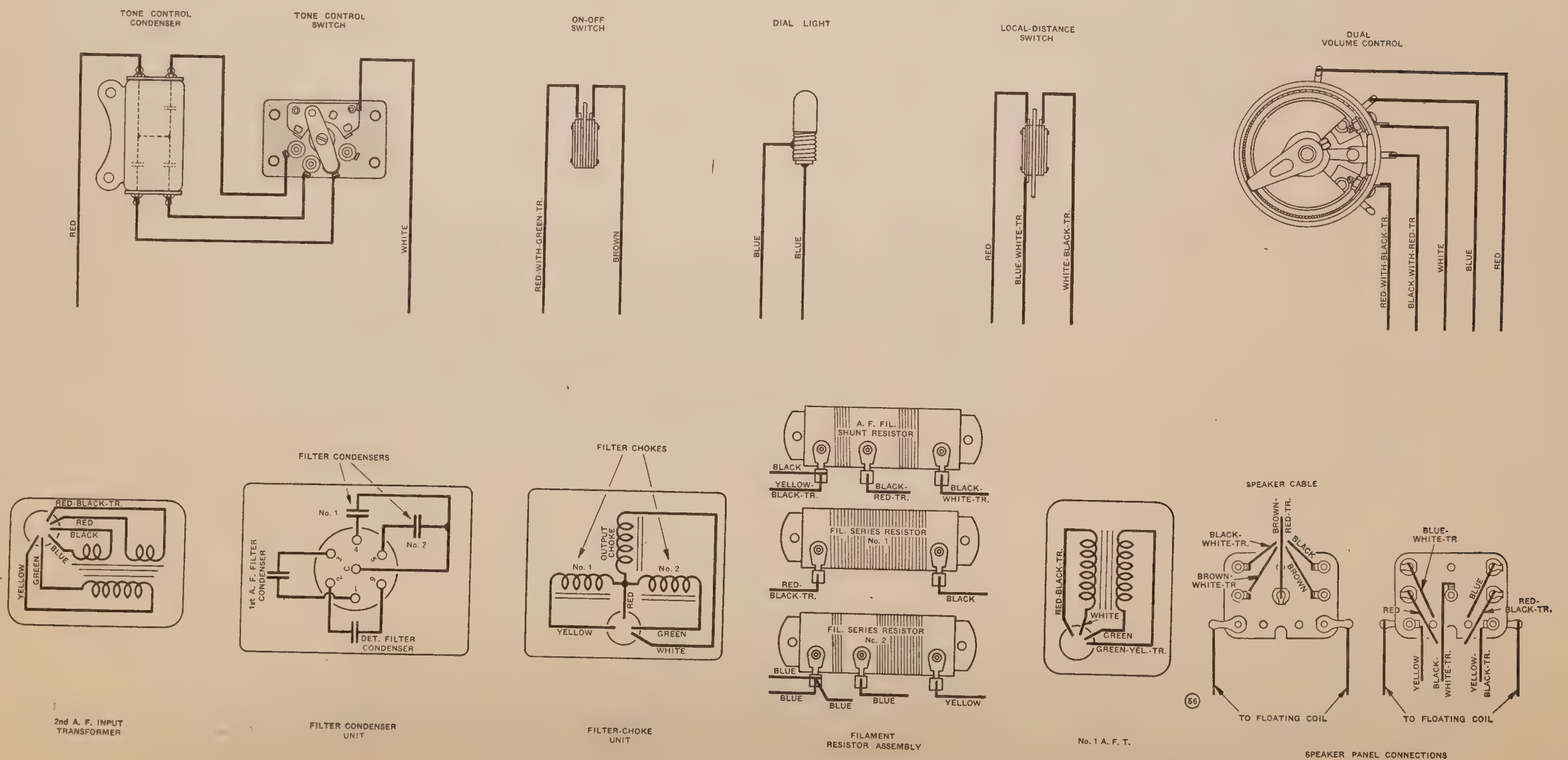

TONE CONTROL CONDENSER
TONE CONTROL SWITCH
RED
WHITE
ON-OFF SWITCH
RED-WITH-GREEN-TR.
BROWN
DIAL LIGHT
BLUE
BLUE
LOCAL-DISTANCE SWITCH
RED
BLUE-WHITE-TR
WHITE-BLACK-TR.
DUAL VOLUME CONTROL
RED-WITH-BLACK-TR.
BLACK-WITH-RED-TR.
WHITE
BLUE
RED
RED-BLACK-TR.
RED
BLACK
BLUE
GREEN
YELLOW
2nd A. F. INPUT TRANSFORMER
FILTER CONDENSERS
No. 1
No. 2
1st A. F. FILTER CONDENSER
DET. FILTER CONDENSER
FILTER CONDENSER UNIT
FILTER CHOKES
OUTPUT CHOKE
No. 1
No. 2
RED
YELLOW
GREEN
WHITE
FILTER-CHOKE UNIT
A. F. FIL. SHUNT RESISTOR
BLACK
YELLOW-BLACK-TR.
BLACK-RED-TR.
BLACK-WHITE-TR.
FIL. SERIES RESISTOR No. 1
RED-BLACK-TR.
BLACK
FIL. SERIES RESISTOR No. 2
BLUE
BLUE
BLUE
BLUE
YELLOW
FILAMENT RESISTOR ASSEMBLY
RED-BLACK-TR.
WHITE
GREEN
GREEN-YEL.-TR.
No. 1 A. F. T.
SPEAKER CABLE
BLACK-WHITE-TR.
BROWN-WHITE-TR
BROWN-RED-TR.
BLACK
BROWN
TO FLOATING COIL
BLUE-WHITE-TR
RED
BLUE
RED-BLACK-TR.
YELLOW
BLACK-WHITE-TR.
YELLOW-BLACK-TR.
TO FLOATING COIL
SPEAKER PANEL CONNECTIONS
66

FIG. 249. CONNECTIONS OF UNITS IN TYPE D-1 AND D-2 CHASSIS.

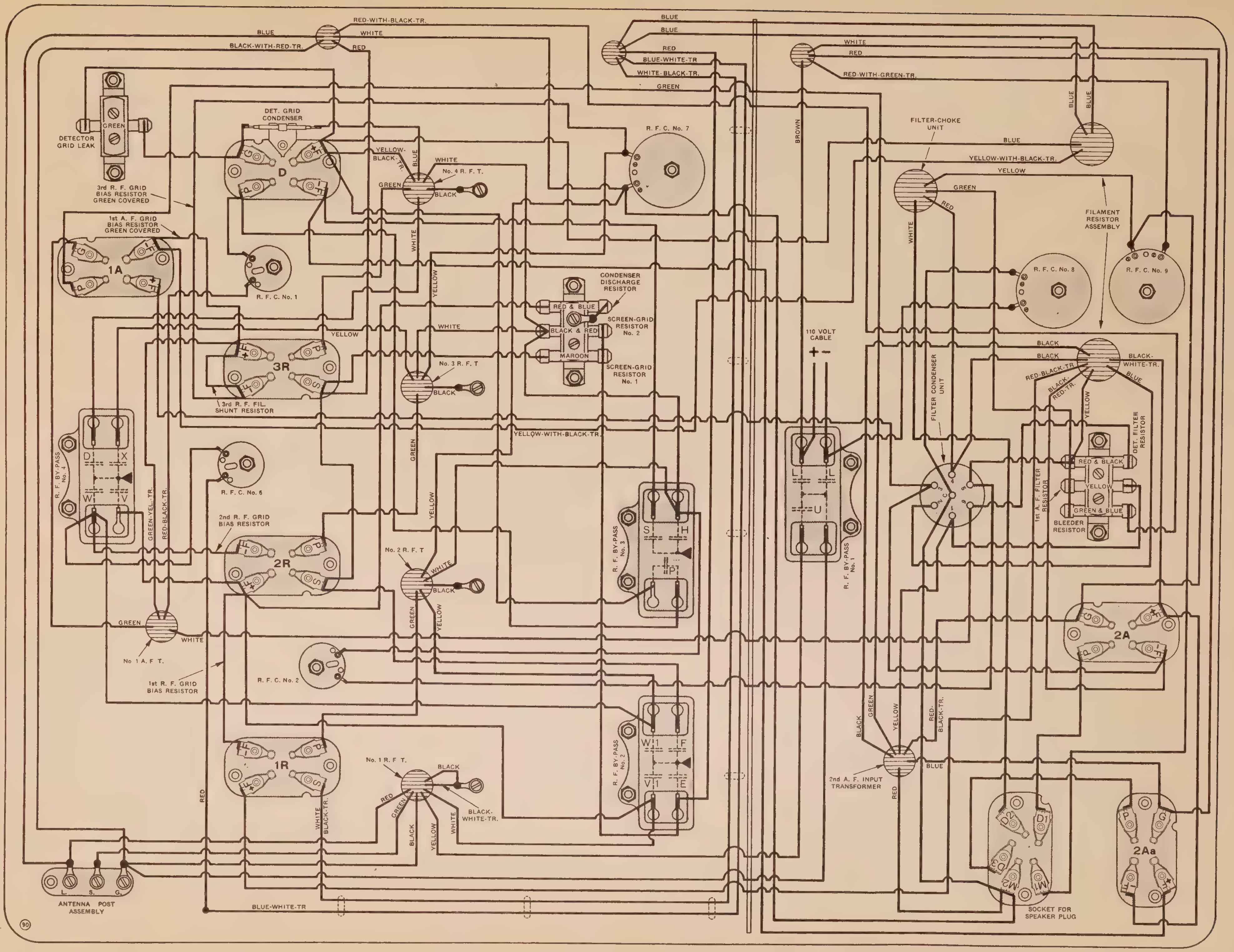

RED-WITH-BLACK-TR.
BLUE
WHITE
BLACK-WITH-RED-TR.
RED
BLUE-WHITE-TR
WHITE-BLACK-TR.
GREEN
RED-WITH-GREEN-TR.
DETECTOR GRID LEAK
DET. GRID CONDENSER
D
YELLOW-BLACK-TR.
No. 4 R. F. T.
BLACK
R. F. C. No. 7
BROWN
FILTER-CHOKE UNIT
YELLOW-WITH-BLACK-TR.
YELLOW
FILAMENT RESISTOR ASSEMBLY
3rd R. F. GRID BIAS RESISTOR GREEN COVERED
1st A. F. GRID BIAS RESISTOR GREEN COVERED
1A
R. F. C. No. 1
CONDENSER DISCHARGE RESISTOR
RED & BLUE
BLACK & RED
MAROON
SCREEN-GRID RESISTOR No. 2
SCREEN-GRID RESISTOR No. 1
R. F. C. No. 8
R. F. C. No. 9
110 VOLT CABLE
+ −
3R
No. 3 R. F. T
3rd R. F. FIL. SHUNT RESISTOR
RED-BLACK-TR
BLACK-WHITE-TR.
BLACK-RED-TR.
R. F. BY-PASS No. 4
D
X
W
V
GREEN-YEL.-TR.
RED-BLACK-TR.
R. F. C. No. 6
2nd R. F. GRID BIAS RESISTOR
L
U
R. F. BY-PASS No. 1
FILTER CONDENSER UNIT
1st A. F. FILTER RESISTOR
DET. FILTER RESISTOR
RED & BLACK
GREEN & BLUE
BLEEDER RESISTOR
2R
No. 2 R. F. T
S
H
P
R. F. BY-PASS No. 3
No 1 A. F. T.
1st R. F. GRID BIAS RESISTOR
R. F. C. No. 2
2A
1R
No. 1 R. F. T.
BLACK-WHITE-TR.
WHITE-BLACK-TR.
W1
F
V1
E
R. F. BY-PASS No. 2
2nd A. F. INPUT TRANSFORMER
D1
D2
D3
M1
M2
SOCKET FOR SPEAKER PLUG
2Aa
ANTENNA POST ASSEMBLY
L. S. G.
BLUE-WHITE-TR
90

FIG. 250. BOTTOM WIRING OF TYPE D-2 CHASSIS.

The parts in the D-2 are exactly the same as the parts in the D-1. The only difference is in the wiring arrangement and reversal of screen-grid resistors No. 1 and No. 2. The D-1 Chassis may be changed into the D-2 by connecting exactly as shown above.

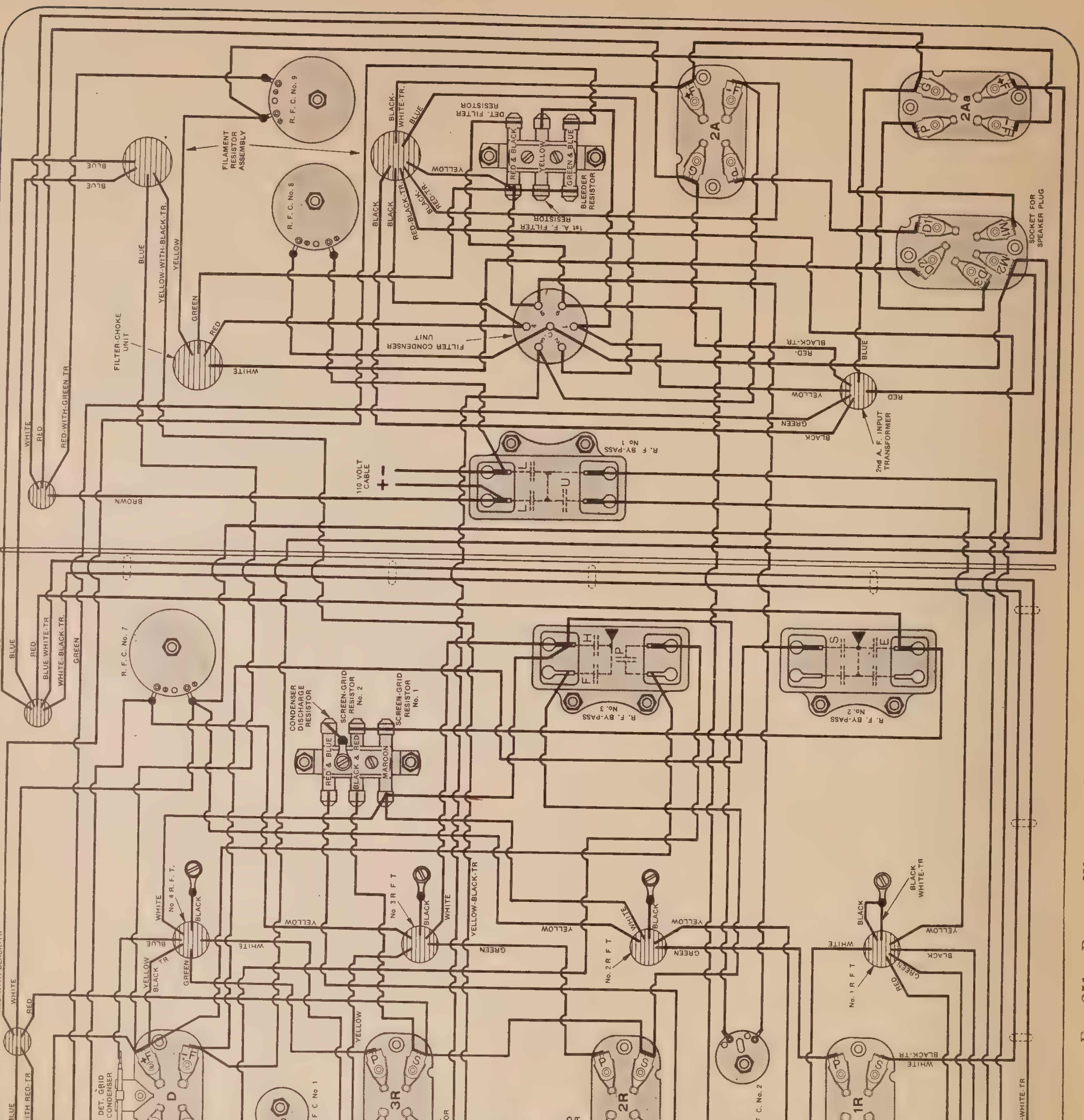

R. F. C. No. 9
FILAMENT RESISTOR ASSEMBLY
DET. FILTER RESISTOR
BLEEDER RESISTOR
1st A. F. FILTER RESISTOR
R. F. C. No. 8
FILTER-CHOKE UNIT
FILTER CONDENSER UNIT
2A
2Aa
SOCKET FOR SPEAKER PLUG
2nd A. F. INPUT TRANSFORMER
110 VOLT CABLE
R. F. BY-PASS No. 1
R. F. C. No. 7
CONDENSER DISCHARGE RESISTOR
SCREEN-GRID RESISTOR No. 2
SCREEN-GRID RESISTOR No. 1
R. F. BY-PASS No. 3
R. F. BY-PASS No. 2
No. 4 R. F. T.
No. 3 R F T
No. 2 R F T
No. 1 R F T
DET. GRID CONDENSER
D
R. F. C. No. 1
3R
3rd R F FIL. SHUNT RESISTOR
R F C No 6
2nd R. F. GRID BIAS RESISTOR
2R
R. F. C. No. 2
1R
1st R. F. GRID BIAS RESISTOR
No. 1 A F T
1st A. F. GRID BIAS RESISTOR GREEN COVERED
3rd R F GRID BIAS RESISTOR GREEN COVERED
1A
R. F. BY PASS No 4
DETECTOR GRID LEAK
ANTENNA POST ASSEMBLY

Fig. 251. Bottom Wiring of Type D-1 Chassis. See Caption of Fig. 250.

PARTS AND PRICE LIST—TYPE D, No. 16700, CHASSIS

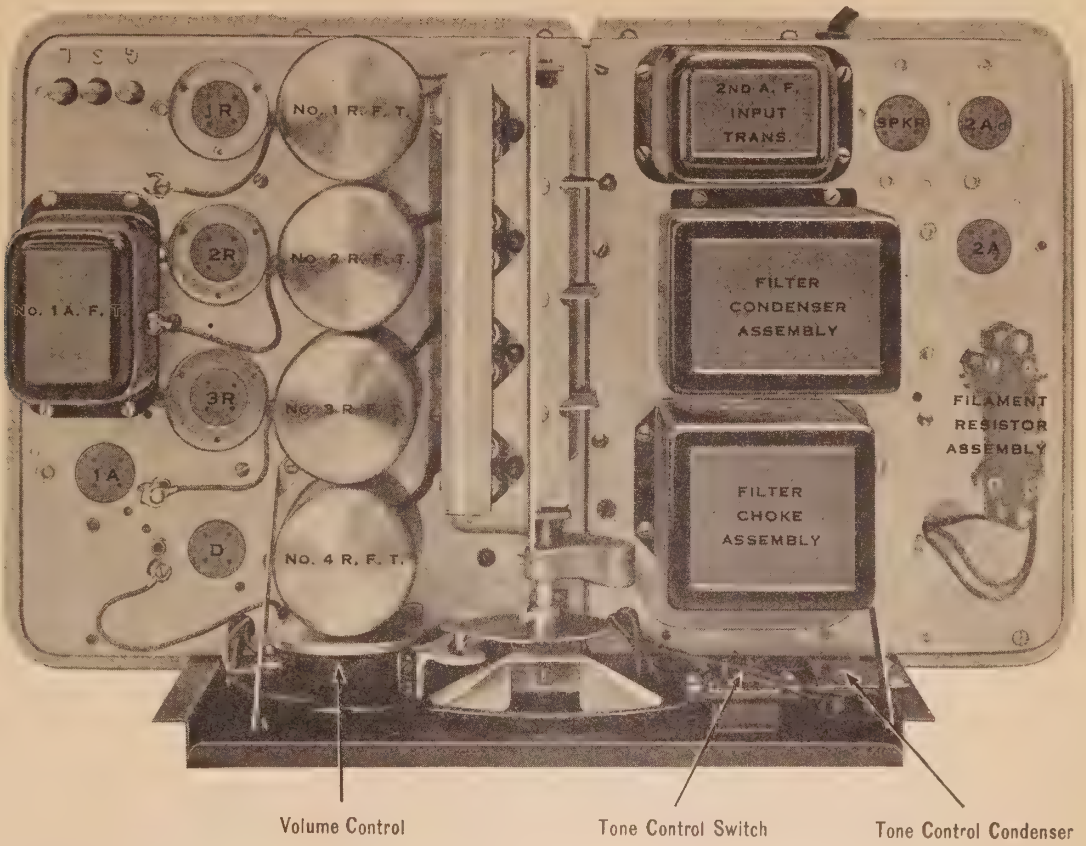

1R
No. 1 R. F. T.
2R
No. 2 R. F. T.
No. 1 A. F. T.
3R
No. 3 R. F. T.
1A
D
No. 4 R. F. T.
2nd A. F. Input Trans.
SPKR
2A
2A
Filter Condenser Assembly
Filament Resistor Assembly
Filter Choke Assembly
Volume Control
Tone Control Switch
Tone Control Condenser

Fig. 252.
Top View of Type D Chassis.

FRONT PANEL ASSEMBLY

Part No.		*Price*
18085	Front panel with dial plate	$1.25
18581	Front panel complete	2.50
17224	Front panel brace (2 used)	.10
17985	Escutcheon	1.00
17244	Volume-control or tone-control knob	.30
16760	Local-distance switch	1.25
16740	On-off switch	1.10
16630	Volume-control	4.50
17876	Volume-control bracket	.20
16576	Volume-control cover	.05
17814	Dial knob	.30
18223	Tone-control condenser clamp	.05
17959	Dial pointer	.05

POWER UNITS

Part No.		*Price*
16890	Filter-choke	$8.60
18232	Filter-choke base plate	.10
18638	Filter-choke lid and name-plate	.20
14710	Filter-condenser	9.70
18188	Filter-condenser case	.45
17534	Filter-condenser spacer (fibre)	.25 c
17070	No. 1 A. F. transformer	4.50
16640	2nd-A. F. input transformer	4.50
16430	TONE-CONTROL SWITCH COMPLETE	.75
18148	Base	.60
18146	Shaft	.12
18112	Contact blade	.03

Part No.		*Price*
18579	VARIABLE CONDENSER STATOR, ROTOR AND FRAME (WITH LEADS AND BALANCE WEIGHT)	$9.60
17107	Rotor-connection (long)	.10
17291	Rotor-connection (short)	.10
16099	Dial light	.25
16420	Dial-light socket and reflector, one-hole mounting (less leads)	.40
16420-A	Dial-light socket and reflector two-hole mounting (less leads)	.40
18615	Dial-gear	.40
17936	Dial-knob bracket (one-hole mounting)	.35
18144	Dial-knob bracket (two-hole mounting)	.35
17935	Dial-knob bracket support (threaded)	.03
17941	Dial-knob shaft	.05
17961	Dial-rubber assembly	.15
17962	Pointer control arm	.30

No separate parts, except those listed above, will be supplied for variable-condenser unit.

COIL GROUP

Part No.		*Price*
17490	R.F. coil group	$4.00
16360	Stopping condenser (3 used)	.10
16360	Compensating condenser (1 used)	.10
17295	R.F. coil shield (4 used)	.50

If one R.F. coil or R.F.C. No. 3, No. 4, No. 5, is defective, the ENTIRE coil group must be replaced.

December, 1930. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE D, No. 16700, CHASSIS

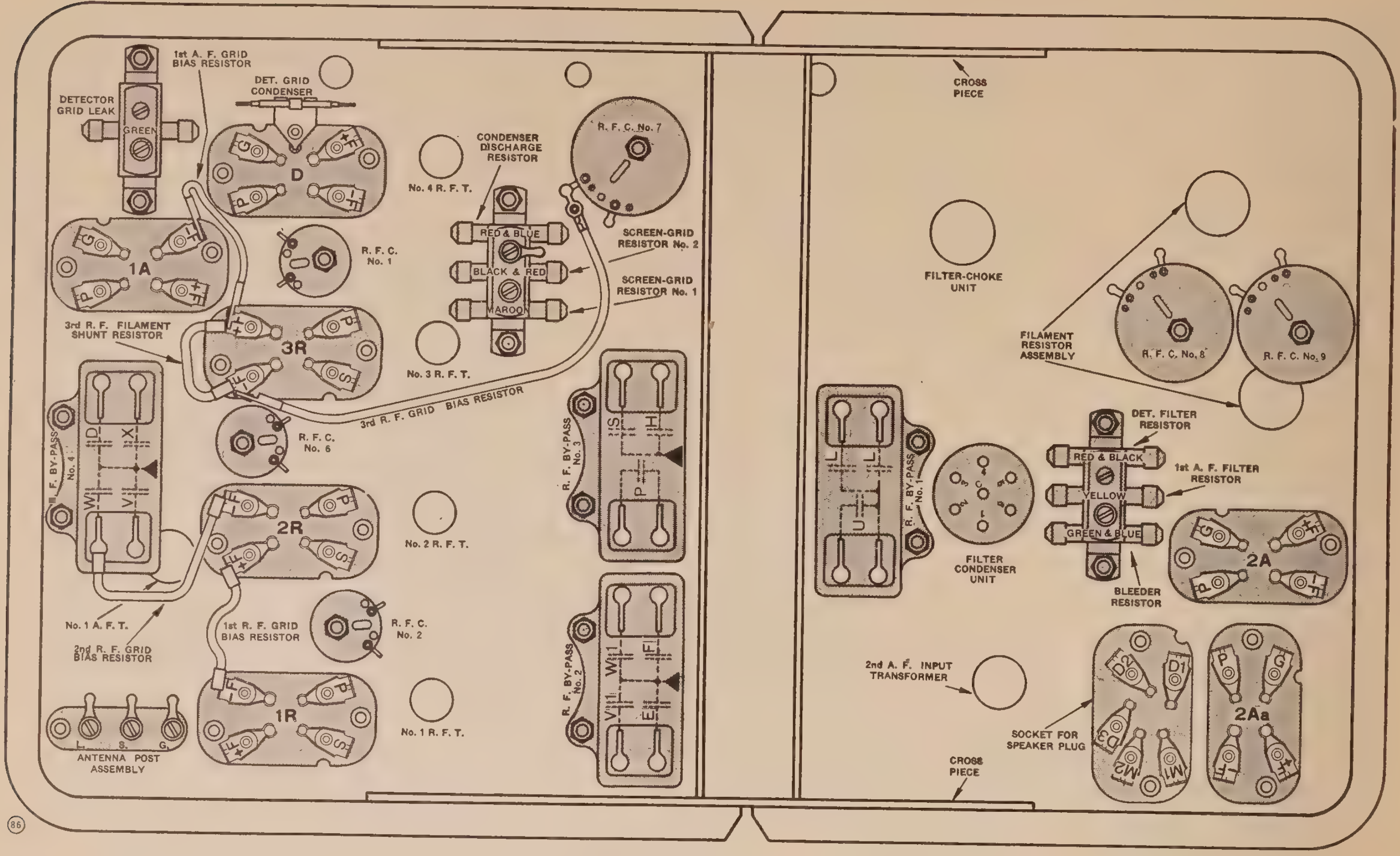

1st A. F. GRID BIAS RESISTOR
DET. GRID CONDENSER
DETECTOR GRID LEAK
GREEN
D
CONDENSER DISCHARGE RESISTOR
No. 4 R. F. T.
R. F. C. No. 7
RED & BLUE
BLACK & RED
MAROON
SCREEN-GRID RESISTOR No. 2
SCREEN-GRID RESISTOR No. 1
1A
R. F. C. No. 1
3rd R. F. FILAMENT SHUNT RESISTOR
3R
No. 3 R. F. T.
3rd R. F. GRID BIAS RESISTOR
R. F. C. No. 6
R. F. BY-PASS No. 4
R. F. BY-PASS No. 3
2R
No. 2 R. F. T.
No. 1 A. F. T.
2nd R. F. GRID BIAS RESISTOR
1st R. F. GRID BIAS RESISTOR
R. F. C. No. 2
R. F. BY-PASS No. 2
1R
No. 1 R. F. T.
L. S. G.
ANTENNA POST ASSEMBLY
86
CROSS PIECE
FILTER-CHOKE UNIT
FILAMENT RESISTOR ASSEMBLY
R. F. C. No. 8
R. F. C. No. 9
DET. FILTER RESISTOR
RED & BLACK
YELLOW
GREEN & BLUE
1st A. F. FILTER RESISTOR
R. F. BY-PASS No. 1
FILTER CONDENSER UNIT
BLEEDER RESISTOR
2A
2nd A. F. INPUT TRANSFORMER
SOCKET FOR SPEAKER PLUG
2Aa
CROSS PIECE

FIG. 253. BOTTOM VIEW OF TYPE D CHASSIS.
In later-type D chassis, a line fuse (2 amperes) is mounted at the right of R. F. by-pass No. 1.

TUBULAR RESISTORS

Part No.		*Price*
15892	Detector grid leak (green)	$ .25
16282	Condenser discharge resistor (blue and red)	.25
15891	Screen grid resistor No. 2 (black and red)	.25
15545	Screen grid resistor No. 1 (maroon)	.25
15891	Det. filter resistor (red and black)	.25
15544	1st-A.F. filter resistor (yellow)	.25
18049	Bleeder resistor (green and blue)	.30
17341	Mounting bracket	.05
17342	Fibre resistor pad	.25/c
17345	Metal clamping strip	.02

FLEXIBLE RESISTORS

Part No.		*Price*
16322	1st-A.F. grid bias resistor	$ .20
16322	3rd-R.F. grid bias resistor	.20
16850	2nd-R.F. grid bias resistor	.20
16860	1st-R.F. grid bias resistor	.20
16840	3rd-R.F. filament shunt resistor	.20

WIRE-WOUND RESISTORS

Part No.		*Price*
18354	Filament series resistor No. 2	$1.00
18355	Filament series resistor No. 1	1.00
18356	A.F. filament shunt resistor	1.00
15972	Mounting bracket (2 used)	.10

FIXED CONDENSERS

Part No.		*Price*
15870	Tone-control condenser	$1.00
16940	R.F. by-pass No. 1	1.10
15262	R.F. by-pass No. 2	1.00
16880	R.F. by-pass No. 3	1.10
15262	R.F. by-pass No. 4	1.00
18419	Grid-condenser assembly (includes detector socket)	.65
16088	Grid condenser	.20
17254	R.F. CHOKE No. 7, No. 8, No. 9	.50
15271-A	R.F. CHOKE No. 1, No. 2, No. 6	.25

SOCKETS

Part No.		*Price*
18417	1R, 2R, 3R tube sockets	$ .25
18418	Det. or 1st A.F. sockets	.25
18419	Det. socket and grid condenser assembly	.65
18398	2A socket	.25
18399	2Aa socket	.25
17377	Socket insulator (7 used)	.25/c
18007	Speaker-plug socket	.30
18016	Socket insulator	.25/c
18449	Fuse socket	.15
16420	Dial-light socket and reflector, one-hole mounting (less leads)	.40
16420-A	Dial-light socket and reflector, two-hole mounting (less leads)	.40

December, 1930. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICES—TYPE D, No. 16700, CHASSIS (Cont'd)

MISCELLANEOUS PARTS

(For screws, nuts, washers and small parts—see page 229.)

Part No.		*Price*
17524	110-volt cable, with plug	$1.90
8956	110-volt plug only	.30
16741	Insulation bushing for 110-volt cable	.05
16742	Retaining spring	.05
17521	Antenna binding posts and base	.45
17323	Antenna and ground post base	.05
8215	Binding Post	.20
17536	Bottom Plate	1.30
13989	Ground-clamp	.30
15213	Tube-shield (3 used)	.15
15214	Tube-shield base (3 used)	.03
17326	Detector cap	.30

Part No.		*Price*
17223	Cross piece (10″ x ⅞″—2 used)	$ .25
17632	Detector cap lead (brown)	.10
	Trimmer-condenser sealing wax	.50 lb.
18118	"Guide" card (form F-680)	.75/c net
18119	Log card (form F-681)	.75/c net
18113	Tuned radio-frequency name-plate	.06
18534	Fuse (2 amperes)	.05
18051	Instruction book	.10 net
15910	Literature assembly	.20 "
18489	Shipping container	.65 "
18117	Balance weight for variable condenser	.35

VOLTAGE TABLE FOR TYPE F CHASSIS

Set in operation. Volume control at maximum.
L-D switch at distance.

Use High Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages.
Use A. C. Voltmeter to Measure Filament Voltages.

APPROX. VOLTAGES, USING 120 V. LINE

TUBE	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
1st-R.F.	2.5	180	6	92
2nd-R.F.	2.5	180	4	93
3rd-R.F.	2.5	180	4	93
Detector	2.5	117	30**	—
1st-A.F.	2.4	70	2	—
2A	2.7	250	55*	—
2Aa	2.7	250	55*	—

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

* Use 250-volt scale.

** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

IDENTIFICATION OF BY-PASS CONDENSERS IN SCREEN-GRID RECEIVERS

The following list gives the identifying markings that are stamped on each by-pass condenser.

Note that by-pass condensers of one part number may have one of several code markings. Thus No. 15262 may be marked B-1, H-1, H-9 or H-20. As these markings are all for the same part number, the condensers so marked are interchangeable—that is, H-20 may be used in place of B-1, H-1 or H-9; or H-1 may be used in place of B-1, H-9, H-20, and so on.

In many cases the code marking is preceded by a numeral such as 1-H-20 or 2-H-20. In all cases the first numeral should be disregarded.

PART NO.	CODE MARKING
15262	B-1, H-1, H-9, H-20
15263	B-2, H-2
15640	H-16
15770	H-15
15780	H-17
15790	H-18, H-21
15837	B-3 (superseded by 16233)
15870	B-7, L-28
16060	H-24, L-29, (304) superseded by 18350

PART NO.	CODE MARKING
16233	H-4, H-10
16461	H-6, H-12
16462	H-5, H-11
16490	B-6, L-12
16745	H-7, H-8, H-13
16828	B-5
16880	H-23, L-26, (439)
16940	H-22, L-10
17360	H-27, L-32
17370	H-25, H-26, L-3 L-39
18350	H-28, L-49

December, 1930. These prices supersede all previous prices and are subject to change without notice.

Centering Top Pole Piece in Electro-Dynamic Speakers

In later-type electro-dynamic speakers, the top pole piece does not have a centering disc. For this reason it is necessary to center the top pole piece whenever this part is replaced or adjusted. This centering requires three gauges. Each gauge may be a three-inch length of No. 54 drill-rod, or if desired the shanks of three No. 54 drills may be used for the same purpose.

Procedure: (1) Loosen the nuts that clamp the top pole piece, the cone housing, and the field-coil case.

(2) Insert the three gauges in the magnet gap, as illustrated in Figure 254. Tighten the bolts very securely and then remove the gauges.

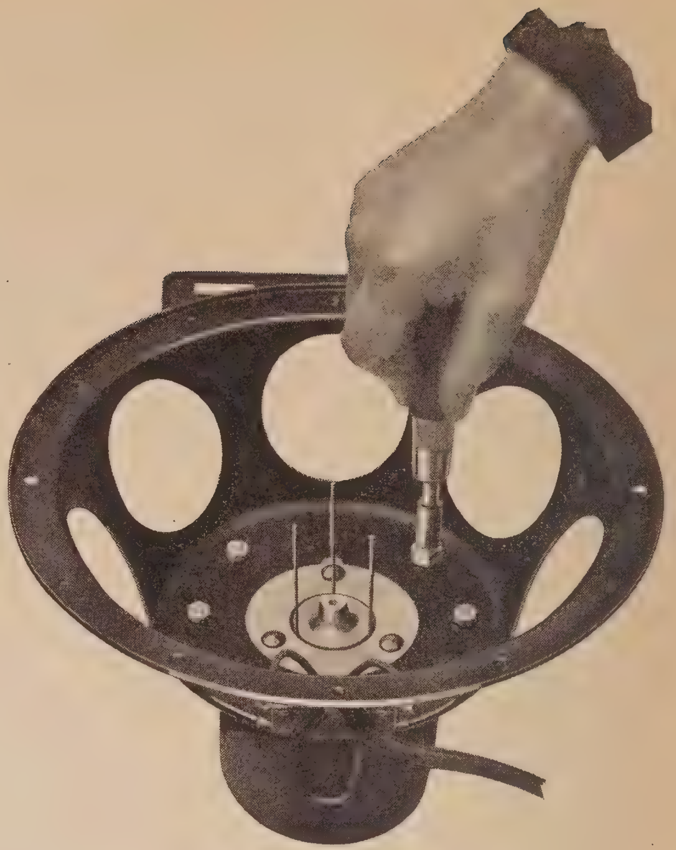


Fig. 254. (At Right.)
Showing Gauges in Position While Tightening Top Pole Piece.

PARTS AND PRICE LIST—TYPE N, N-3, CHASSIS SPEAKERS

(For screws, nuts, and small parts, see Page 229.)

TYPE N, No. 16400

Part No.		*Price*
18081	Diaphragm	$3.25
16410	Field coil	5.00
18093	Field-coil insulator	.02
18075	Field-coil spacer	.09
18055	Top pole piece	1.25
18073	Cone-housing with terminal card	$2.60
17889	Terminal card	.12
17796	Terminal-card insulator	.02
17803	Terminal-card cover	.12
17895	Cable and plug assembly	1.65
18582	Plug only	.65
14382	Steel ring (3 segments)	1.00
16390	Output transformer (before No. 6852901 and from 6938001 to 6943001)	3.25
16390-A	Output transformer (from 6852901 to 6937000, and above 6943001)	3.25
	5-Conductor Cable	.14/ft.
18068	Instruction sheet	.02 net
15578-N	Shipping container	.35 "

TYPE N-3, No. 16900

Parts not listed below are same as those used in "N" No. 16400 Chassis speaker.

Part No.		*Price*
17020	Field coil	$8.00
16390	Output transformer (before No. 7477302)	3.25
16390-A	Output transformer (after No. 7477302)	3.25
	5-Conductor cable	.14/ft.
18542	Instruction sheet	.02 net
15578-N-3	Shipping container	.35 "

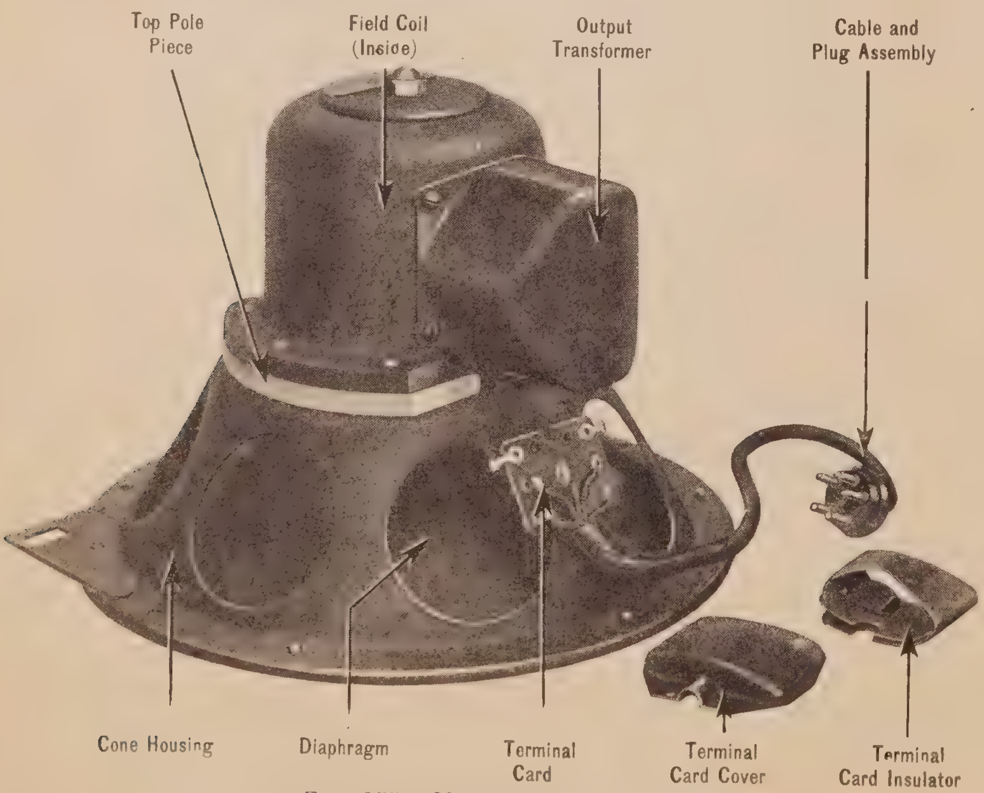


Fig. 255. N or N-3 Speaker.

December, 1930. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPES J AND JB INDUCTOR SPEAKERS

(For screws, nuts, and small parts, see Page 229.)

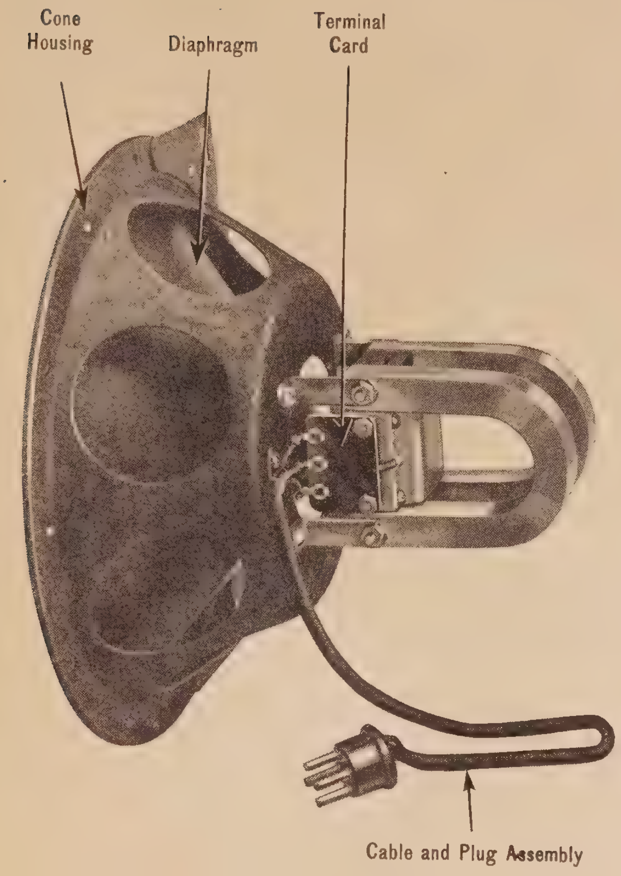


FIG. 256. TYPE J SPEAKER.

TYPE J, No. 15920, CHASSIS SPEAKER

Part No.		*Price*
17856	Diaphragm	$ 1.50
17864	Sound unit complete	10.90
17862	Terminal card	.20
17858	Cone housing	2.60
17866	Cable and plug assembly	1.60
15079	Plug only	.65
17827	Cable clamp	.05
14382	Steel ring (3 segments)	1.00
	3-Conductor cable	.10/ft.
17872	Instruction sheet	.02 net
19336	Shipping container	.35 "

IMPORTANT

No separate parts are furnished for the No. 17864 and 17864-B sound units in the type J and JB inductor speakers.

If any part of the sound unit (illustrated at right) requires replacement or adjustment, return the complete unit, exactly as shown, to the factory.

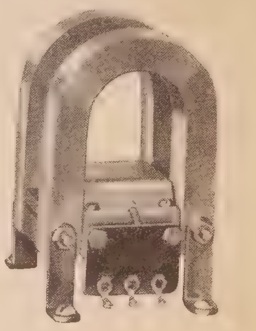


FIG. 257. No. 17864, SOUND UNIT, COMPLETE.

TYPE "JB" SPEAKER, No. 17010

NOTE:—All parts not listed below are same as used in Type "J" No. 16920 Chassis Speaker.

Part No.		*Price*
17847	Cone housing	$ 2.60
17864-B	Sound unit, less resistor	10.90
19345	Terminal card, less resistor	.20
19346	Resistor (green and red)	.30
18577	Frame	3.75
18578	Felt pad (1 used)	.75/c
16734	Front frame	5.50
16735	Front screen	2.10
4259	Cord	.80
	2-Conductor Cable	.08/ft.
18573	Instruction sheet	.02 net
16695	Shipping container	.35 "

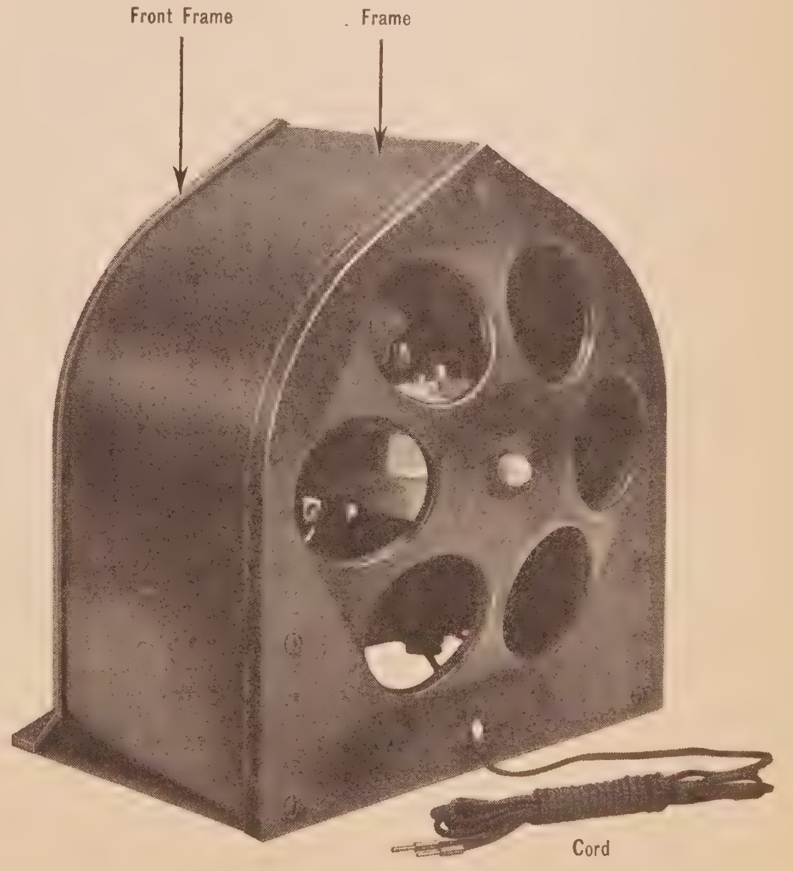


FIG. 258. TYPE JB SPEAKER (REAR VIEW).

December, 1930. These prices supersede all previous prices and are subject to change without notice.

Output Measuring Circuit for All Types of Atwater Kent Receivers

In the output measuring circuit, shown in Figure 259, only one speaker, a Type JB, is required in testing any type of Atwater Kent receiver. This eliminates the necessity of tying up four or five electro-dynamic speakers.

This improvement is made possible through the use of a special output transformer, and a series of resistors which take the place of the field coil in the various types of Atwater Kent electro-dynamic speakers.

OPERATION

(A) Throw S1 to the right to test for quality on the JB speaker. Throw S1 to the left to pick up oscillator signals on the phones when synchronizing variable condensers.

(B) When testing an A. C.-operated electro-dynamic set, move S4 to the tap that gives the correct resistance to take the place of the field coil in the speaker for that particular set.

Tap 1 (left) takes place of F-6 field coil.
Tap 2 takes place of F-4 or N field coil.
Tap 3 takes place of F-2 field coil.
Tap 4 takes place of F field coil.

It is NOT necessary to use a "dummy" field load when testing a battery-operated or D. C.-operated electro-dynamic receiver. When testing such a receiver, S4 may be turned to the 4th tap (right).

(C) MAGNETIC SETS. When testing a magnetic-type set, such as Models 20, 35, 37, 40, etc., connect the two-conductor cord to the speaker-posts on the set being tested. Close both S2 and S3 if a reading on the meter is desired; open either S2 or S3 to open the meter circuit.

(D) INDUCTOR SETS. In testing a Type Q Chassis, insert the three-conductor plug in the speaker-plug socket on the Q Chassis. Close both S2 and S3 if a reading is desired on the output meter. Open either S2 or S3 to open the meter circuit.

(E) FIVE-PRONG ELECTRO-DYNAMIC SETS. In testing an L, P, D, F or H Chassis, insert the five-conductor plug in the speaker-plug socket on the chassis, and, if the chassis is A. C.-operated, set S4 at the correct tap. To get a reading on the meter, close S2 and S3; to open the meter circuit, open either S2 or S3.

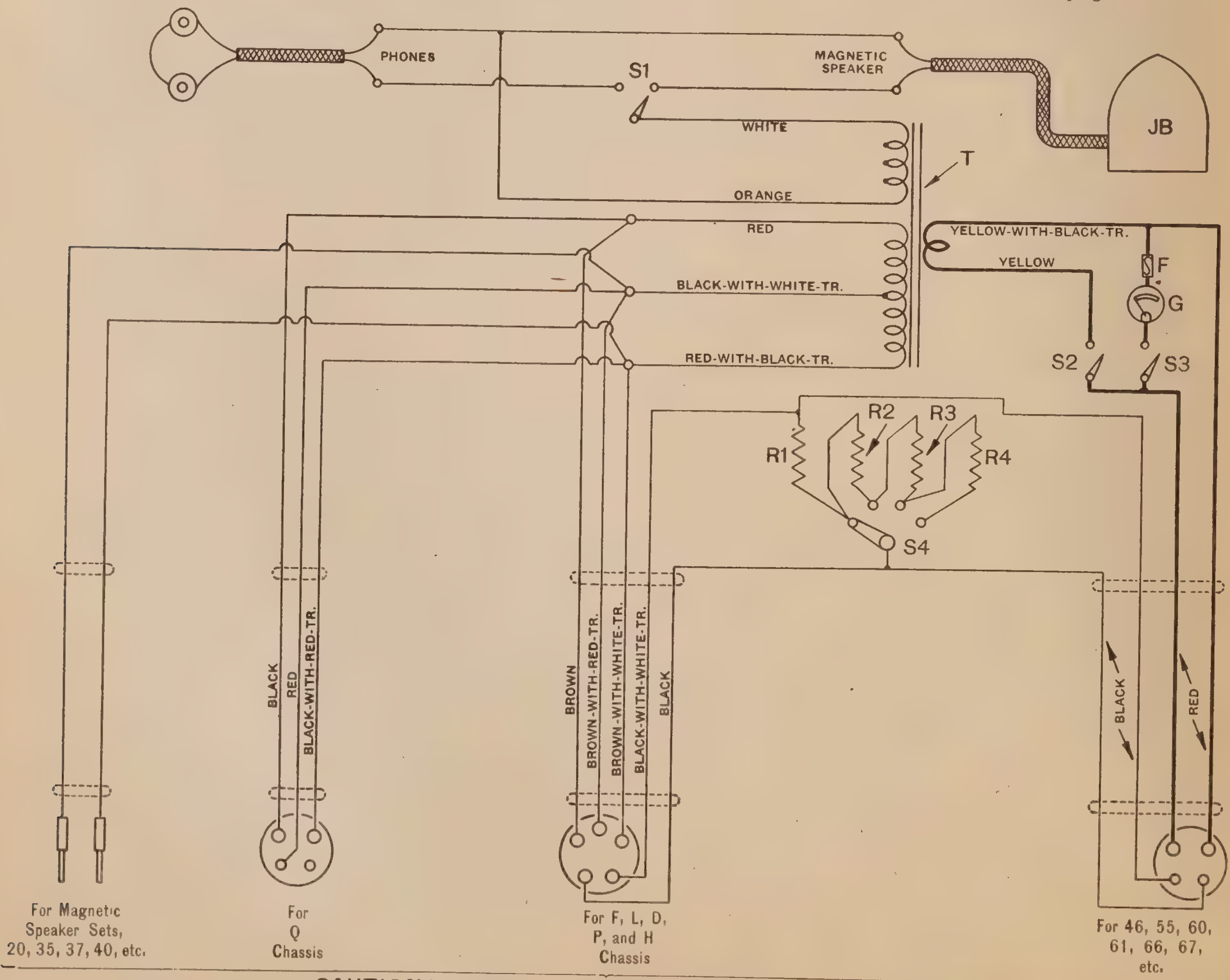
(F) FOUR-PRONG ELECTRO-DYNAMIC SETS. In testing a Model 46, 55, 60, 61, 66, 67, etc., insert the four-conductor plug in the speaker-plug socket on the chassis. If the chassis is A. C.-operated, set S4 at the correct tap. To get a reading on the meter, close S3 and open S2. To operate the phones or JB speaker, close S2 and open S3. To operate both the phones and the meter, close both S2 and S3.

LIST OF PARTS

(With the exception of fuse ("F") and meter ("G") only standard Atwater Kent parts are used in this circuit.)

T—No. 18911 output transformer. This transformer has an extra winding which couples the speaker or phones to the output circuit of the particular set that is being tested.

S1—No. 13678 toggle switch.
S2, S3—No. 9991 toggle switches.
S4—No. 16430 switch.
R1—Four No. 16988 resistors in series.
R2—Three No. 16988 resistors in series.
R3—Four No. 16988 resistors in series.
R4—Five No. 16988 resistors in series.
F—1/4 ampere fuse.
G—115 ma, thermo-coupled galvanometer.
1—No. 14169 double-conductor cord.
1—No. 17866 three-conductor cord-and-plug.
1—No. 17556 four-conductor cord-and-plug.
1—No. 17895 five-conductor cord-and-plug.



CAUTION: USE ONLY ONE OF THESE FOUR CABLES AT ONE TIME.

FIG. 259. UNIVERSAL OUTPUT MEASURING CIRCUIT FOR ALL TYPES OF ATWATER KENT RECEIVERS.

ATWATER KENT RADIO

SERVICE DATA

With

PARTS LIST AND PRICE LIST FOR

TYPE H CHASSIS RECEIVER

and

TYPE N SPEAKER

INDEX OF CONTENTS

	Theory	Testing Equipment	Trimmer Adjustment	Circuit	Top View	Bottom Chart	Bottom Wiring	Panel and Power Units	Voltage Table	Parts List
H-1	P. 258 to P. 261	P. 262	P. 269	P. 264	P. 268	P. 265 P. 277	P. 266 P. 267	P. 263	P. 265	P. 276 P. 277
H-2	P. 258 to P. 261	P. 262	P. 275	P. 272	P. 274	P. 273 P. 279	P. 270 P. 271	P. 263	P. 273	P. 278 P. 279

Advantages of Atwater Kent Type H Super-Heterodyne

1—Like all other Atwater Kent receivers, Type H chassis has Atwater Kent expert design, precision workmanship, rugged construction, and life-time reliability.

2—It has Atwater Kent Tone Control, providing four definite shadings of the Golden Voice to please each owner.

3—It has the unexcelled Quick Vision Dial with accurate scale calibration that makes tuning easy, quick and convenient.

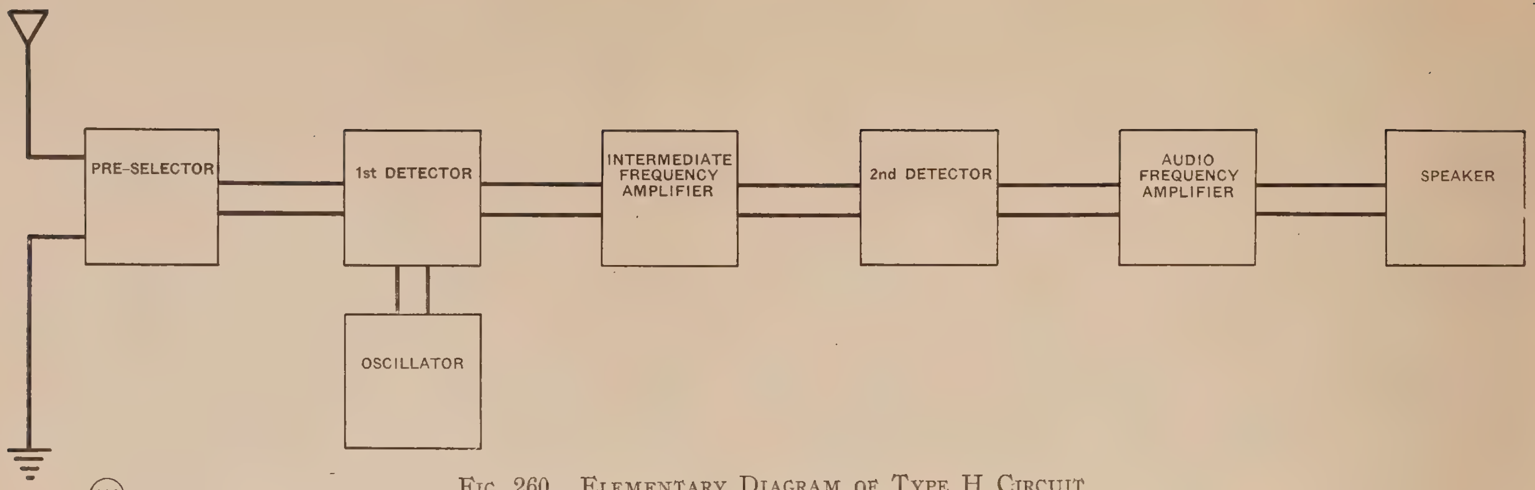
4—Type H chassis is extremely selective. This can be demonstrated by the ease of separating stations on adjacent broadcast channels. The resonance curve of this receiver has very steep sides and a practically flat top. The selectivity is practically constant over the broadcast range.

5—Type H-2 chassis has ten tuned circuits, three in the pre-selector tuned to the desired frequency, one in the pre-selector tuned to exclude the interfering frequency, one in the oscillator, and five in the intermediate-frequency amplifier. Each one of these ten tuned circuits contributes to the remarkable selectivity of the Atwater Kent super-heterodyne.

6—There is no difficulty from "double-spot" reception. Each station is received at only one position on the dial, not two.

7—Type H chassis tunes in and out of stations quietly and without distortion.

8—The antenna adjustment on Type H-2 makes it possible to fit the set to any antenna. This feature has proved to be highly desirable.



(114)

FIG. 260. ELEMENTARY DIAGRAM OF TYPE H CIRCUIT

A Brief Explanation of The Origin and Action of The Super-Heterodyne Circuit

The super-heterodyne circuit was originated about 1918 primarily for the purpose of getting around certain limitations in the radio-frequency amplifiers that were then available.

At that time it was difficult to build sensitive and perfectly controlled amplifiers to cover a WIDE BAND OF HIGH radio frequencies (above about 500 kilocycles).

But it was possible to build sensitive and well-controlled FIXED-TUNED amplifiers to cover a NARROW BAND of LOW radio frequencies (below about 200 kilocycles).

With such amplifiers available, it was a logical step to decide to use high radio frequencies for transmission, receive the high radio frequency on a suitable tuner, convert it (at the receiver) to a low radio frequency, and then amplify the low radio frequency in an amplifier designed for this purpose.

The method used to convert a high radio frequency to a low radio frequency is based on a simple electrical principle that when energy of two different frequencies is combined in a suitable detector, there is produced, among other things, a third frequency (termed the beat note or intermediate frequency) which is equal to the difference between the first two frequencies.

Thus if we have an amplifier designed for 130 kilocycles and we wish to receive a broadcast signal of 1,500 kilocycles, we supply a locally-generated frequency either 130 kilocycles higher or 130 kilocycles lower than the received broadcast signal of 1,500 kilocycles. The combination of the received broadcast signal and the locally-generated signal gives a beat note or intermediate frequency equal to the difference between them or 130 kilocycles.

If the desired broadcast signal is 550 K. C. and we wish to convert it to 130 K. C. the same idea applies. In this case the locally-supplied frequency must be 130 K. C. higher or lower than 550 K. C. in order to give an intermediate frequency of 130 K. C.

(In the Atwater Kent super-heterodyne, the locally-supplied frequency, furnished by a tuned vacuum-tube oscillator, is arranged to be always 130 kilocycles more than the frequency of the received signal.)

This system, originated in 1918, and known as the super-heterodyne, proved very successful, and the same underlying principle is used today in modern super-heterodyne receivers. However, it was not until the perfection of the screen-grid tube, and its successful application to the super-heterodyne circuit, that this system was able to compete commercially with modern tuned radio-frequency receivers which had outdistanced the super-heterodyne in practical developments during the last few years.

Definition of Some Terms and Abbreviations Used In This Supplement

Super-heterodyne = The name applied to a radio receiving system in which the received frequency is converted to a different frequency and then amplified.

K. C. = Kilocycle per second. One kilocycle equals 1,000 cycles per second.

R. F. = Radio frequency. The broadcast range of radio frequencies covers from 550 K. C. to 1,500 K. C.

I. F. = Intermediate frequency. This is the beat note or difference between the received broadcast frequency and the oscillator frequency. In the Atwater Kent super-heterodyne, the intermediate frequency is 130 K. C., corresponding to about 2,310 meters.

A. F. = Audio frequency. The audio-frequency range is from 16 to 10,000 cycles.

R. F. T., I. F. T., A. F. T. = Transformer designed to couple R. F., I. F. or A. F. circuits respectively.

Trimmer = A small adjustable condenser which is used to tune or trim a circuit to the correct frequency.

Pre-selector = A series of tuned circuits that are used to select the desired broadcast frequency, at the same time excluding all undesired frequencies.

1st-detector = The tube in which the combined energy of the received signal and the oscillator signal is rectified. The plate circuit of this tube is tuned to the intermediate frequency.

Osc. = Oscillator. In the Atwater Kent super-heterodyne the oscillator is a tuned vacuum-tube generator of radio-frequency energy. Its frequency is 130 K. C. more than the frequency to which the set is tuned.

I. F. Amplifier = Amplifier in which the strength of the intermediate-frequency signal is increased before it passes into the 2nd-detector.

2nd-detector = The tube in which the amplified intermediate frequency signal is rectified. The modulation or A. F. component of the intermediate-frequency signal is then passed into the A. F. amplifier.

Double-spot reception = In some super-heterodyne circuits a local station may be received at two different points on the dial. This is explained on pages 260 and 261.

SERVICE NOTES

Testing

When a Type H chassis requires servicing, it will save time and needless work to determine definitely first that the trouble is not in the tubes, the antenna, irregular power supply, or a peculiar local receiving condition.

After checking these points thoroughly, examine the chassis and inspect the wiring, socket contacts, and parts for open circuits, short circuits, and grounds. Measure the voltages at each socket and correct any defects that may be discovered.

Then, and not before, systematically check over the R. F. and I. F. trimmer condensers in accordance with the instructions on pages 269 and 275.

Don't forget that it requires suitable equipment, and considerable time, knowledge and skill to adjust a super-heterodyne receiver. Don't be discouraged if it seems difficult at first—but work systematically and follow the instructions carefully.

Trimmer Adjustments

There are four groups of trimmer adjustments and it is very essential to have a clear idea of each group and how each group affects the set. It is also important to know which trimmers are so inter-related that adjustment of one affects the other.

With a clear idea of this grouping it is rather easy to diagnose trouble and to adjust the receiver for maximum performance.

The four groups of trimmers are as follows:

(1) **The intermediate frequency trimmers** (three in the H-1, and five in the H-2). These are adjusted for maximum output from a 130 K. C. oscillator signal.

(2) **The oscillator trimmer** is adjusted at 1,500 K. C. and the oscillator-transformer adjusting disc (bottom of set) is adjusted at 800 K. C. Adjustment of one affects the other. Both must be adjusted correctly to make the dial calibration accurate. It is necessary to repeat the adjustment at 1,500 and at 800 K. C. until further adjustment gives no change in dial reading.

(3) **The pre-selector trimmers.** In the H-1, these are trimmers Nos. 1, 2 and 3, shown on page 268. In the H-2 they are trimmers Nos. 2 and 3, and the antenna trimmer which takes the place of trimmer No. 1 (see page 274). The pre-selector trimmers are adjusted for maximum output on a 1,500 K. C. oscillator signal. In both the H-1 and H-2, adjustment of trimmer No. 3 affects the adjustment of the double-spot trimmer.

(4) **The double-spot trimmer.** This is affected by adjustment of trimmer No. 3. Trimmer No. 3 is adjusted to give peak response to a normal 1,500 K. C. oscillator signal. The double-spot trimmer is adjusted to give **minimum** response to the double-spot point (1,240 K. C.) of an extra strong 1,500 K. C. signal. It is necessary to repeat the adjustment at 1,500 K. C. and at 1,240 K. C. until further adjustment gives no change in output.

Oscillator Notes

The oscillator trimmer condenser requires very careful adjustment because the accuracy of the dial calibration depends on the oscillator frequency. DO NOT ADJUST THE OSCILLATOR TRIMMER CONDENSER UNNECESSARILY because it may result in throwing the whole set out of adjustment.

It is possible to get reception at two different adjustments of the oscillator trimmer condenser, but it is important to use only the first adjustment which is secured as the oscillator trimmer is screwed in from a loose position.

When using slow-heating tubes, the Atwater Kent super-heterodyne may suddenly snap into operation about 20 seconds after the power switch is turned on. This is a perfectly normal action and is caused by the fact that the oscillator tube snaps into operation—it does not start gradually. If a quick-heating tube is used in the oscillator socket, it will be operating by the time the other tubes warm up and in this case the set will start gradually.

The spring and felt pad that presses against the rotor plates on the oscillator variable condenser are used to prevent microphonic movement of the rotor plates; such movement might otherwise result in undesirable noise.

It will be noted also that two rotor plates on the oscillator variable condenser are cut differently from the others. This is part of the design that keeps the oscillator "tracking" 130 kilocycles above whatever frequency the pre-selector is tuned to.

Antenna Circuit

Type H-2 chassis has a small trimmer condenser connected in series with the antenna. Adjustment of this trimmer makes it unnecessary to use a trimmer across No. 1 variable condenser.

Ordinarily when a condenser is connected in series with the antenna, the antenna tends to accumulate a static charge that discharges by sparking across the condenser, thus producing noise in the receiver. To prevent such an action in Type H-2 chassis, an R. F. choke coil is connected across the antenna trimmer. It acts as a leak to any static charge on the antenna.

Type H-2 chassis often gives excellent results with the ground as an antenna (no connection to the ground post). If an antenna is used, a length of 50 to 75 feet is recommended.

Double-Spot Reception

If a heterodyne whistle is present, it may be caused by incorrect adjustment of the double-spot circuit. To test for this, touch the control grid of the 1st-detector and if the squeal increases, readjust the double-spot circuit. Or if a local station is received at two points on the dial, one point being about 260 kilocycles below its normal frequency, the double-spot circuit may be adjusted to eliminate this effect. (See page 261.)

Replacing Parts

I. F. transformers. If one I. F. transformer is defective, it is not necessary to replace both. Replace the defective one and re-adjust its associated trimmer condensers on a 130 K. C. oscillator signal.

R. F. transformers. If one R. F. transformer is defective it is necessary to replace the whole group.

The pre-selector and oscillator trimmers must be re-adjusted as described on Pages 269 and 275.

(Continued on Page 262)

ELIMINATING "DOUBLE-SPOT" RECEPTION

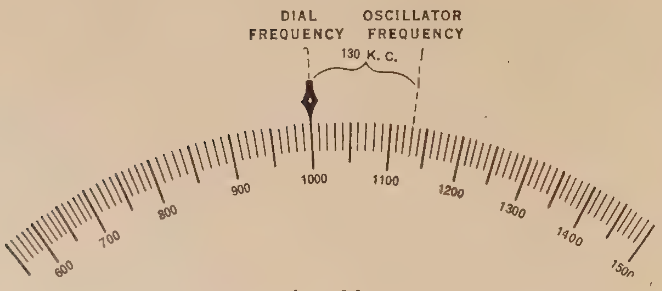

DIAL FREQUENCY
OSCILLATOR FREQUENCY
130 K. C.
600
700
800
900
1000
1100
1200
1300
1400
1500

Fig. 261

1. The oscillator in Atwater Kent Type H chassis is always tuned 130 kilocycles ABOVE the dial frequency. Thus: if, as in Figure 261, the dial is tuned to 1000 K. C., the oscillator is simultaneously tuned to 1130 K. C. The difference between these two frequencies produces a beat note or intermediate frequency of 130 kilocycles.

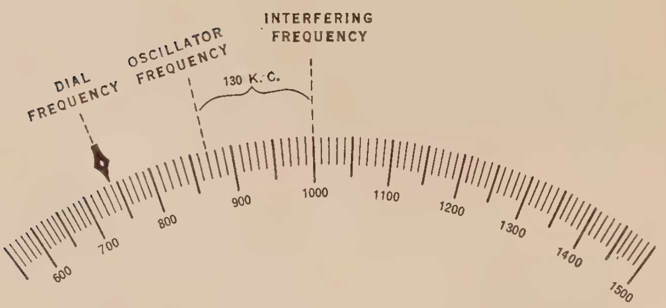

DIAL FREQUENCY
OSCILLATOR FREQUENCY
INTERFERING FREQUENCY
130 K. C.
600
700
800
900
1000
1100
1200
1300
1400
1500

Fig. 262

2. An intermediate frequency or beat note may be produced if the oscillator is EITHER 130 K. C. ABOVE, or 130 K. C. BELOW the frequency of the received station. Therefore, if there is a strong station at say 1000 K.C., and the dial of the set is tuned to 740 K. C. (bringing the oscillator to 870 K. C., or 130 K. C. BELOW 1000 K. C.) and if any energy from the 1000 K. C. signal gets through the pre-selector, it will beat with the oscillator signal and produce a 130 K. C. beat note. Under such a condition, the received 1000 K. C. signal would be heard when the dial is tuned to 740 K. C. The reception of the 1000 K. C. signal with the dial tuned to 740 K. C. is in addition to the normal reception when the dial is tuned to 1000 K. C.

This action is known as double-spot reception, and as it is an undesirable condition, a special arrangement has been developed in the Atwater Kent Type H circuit to eliminate any difficulties from this source.

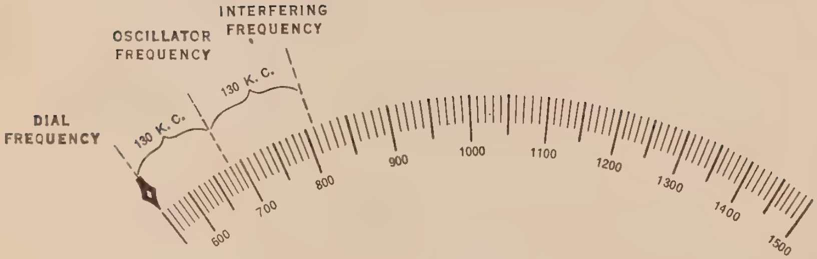

INTERFERING FREQUENCY
OSCILLATOR FREQUENCY
DIAL FREQUENCY
130 K. C.
130 K. C.
600
700
800
900
1000
1100
1200
1300
1400
1500

Fig. 263

3. From observation of Figures 262, 263 and 264, it will be seen that the double-spot point of a strong interfering signal is 260 K. C. less than the frequency of the interfering signal. Or, in other words, the interfering frequency that causes double-spot reception is always 260 K. C. more than the dial (pre-selector) frequency.

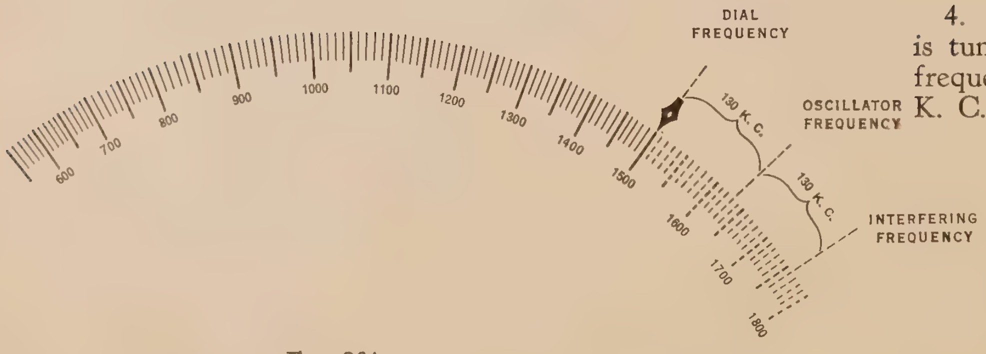

DIAL FREQUENCY
OSCILLATOR FREQUENCY
INTERFERING FREQUENCY
130 K. C.
130 K. C.
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800

Fig. 264

4. Thus in Figure 263, when the dial is tuned to 550 K. C., the interfering frequency is 260 K. C. more, or 810 K. C. Or, as in Figure 264, when the dial is tuned to 1500 K. C., the interfering frequency is 260 K. C. more, or 1760 K. C.

(Continued on Page 261)

5. As the interfering signal that causes double-spot reception is always 260 K. C. more than the dial or pre-selector frequency, it is necessary to prevent any energy at this frequency from entering the 1st-detector. This is accomplished by the circuit arrangement shown in Figure 266.

In this circuit, No. 4 R. F. T. and No. 3 variable condenser form an acceptor circuit across the input of the 1st-detector. This acceptor circuit is tuned simultaneously with the pre-selector, but its frequency is always 260 K. C. higher than the pre-selector or dial frequency. The acceptor circuit acts as a short circuit to any energy at a frequency 260 K. C higher than the frequency to which the pre-selector is tuned. It therefore practically eliminates any of the energy that might otherwise cause double-spot reception.

Because of the fact that the double-spot trimmer and the trimmer of No. 3 variable condenser are in the same circuit, adjustment of one affects the other. The proper adjustment is secured when further adjustment of either trimmer does not increase the 1500 K. C. signal strength, and does not further decrease the double-spot volume at 1240 K. C.

The method used in adjusting the double-spot circuit is described below and also on Pages 269 and 275.

6. **Adjustment of Double-Spot Circuit.**

It is necessary to have a 1500 K. C. oscillator that may be switched from a normal strength to an extra-strong signal. The extra-strong 1500 K. C. signal must be of such strength that the double-spot volume of this signal (which is tuned in at 1240 K. C.) can not be entirely eliminated even with the double-spot circuit correctly adjusted. This is necessary in order to make an accurate adjustment of the double-spot trimmer. If there was no response at the double-spot point over a wide adjustment of the double-spot trimmer it would be impossible to set this trimmer to the correct point.

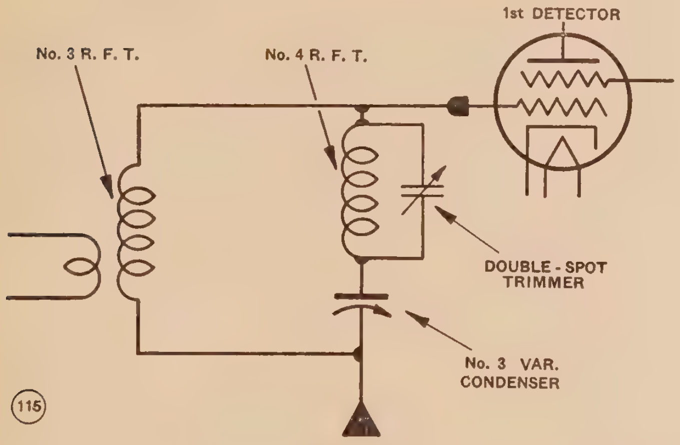


Fig. 266. The Double-Spot Circuit Is Simultaneously Tuned to Two Different Frequencies

The complete circuit, consisting of No. 3 and No. 4 R. F. T. and No. 3 variable condenser, is tuned to the desired broadcast frequency. A part of this circuit, consisting of No. 4 R. F. T., the double-spot trimmer, and No. 3 variable condenser, is automatically tuned to 260 kilocycles more than the desired broadcast frequency. This later circuit, connected from grid to cathode of the 1st detector, acts as an acceptor circuit, or short circuit, to the frequency of the signal that might otherwise cause double-spot reception. This action is described in the text.

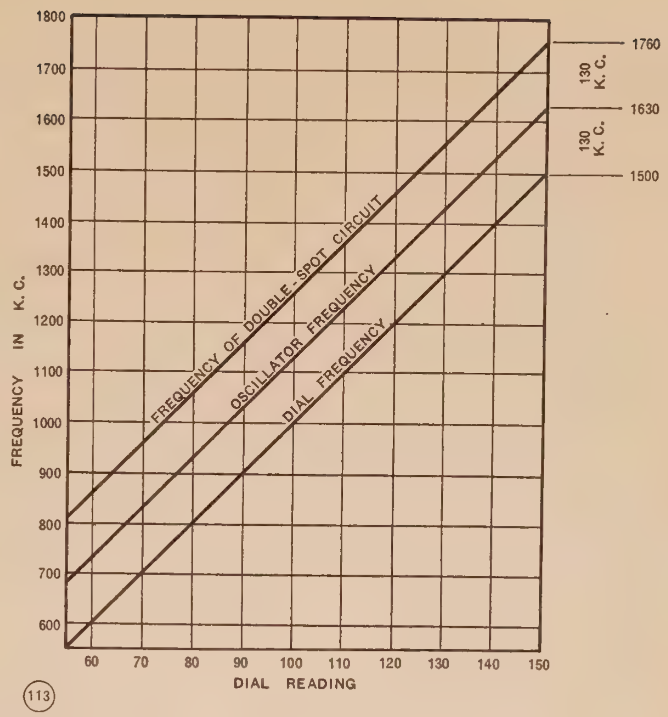


Fig. 265. This Graph Represents an Ideal Condition of the Three Frequency Ranges Covered Respectively by the Pre-Selector (Dial Frequency), the Oscillator, and the Double-Spot Circuit

For any given setting of the dial, the oscillator frequency is 130 kilocycles more than the dial frequency, and the double-spot circuit is 260 kilocycles more than the dial frequency.

Procedure.

(a) Using the normal-strength 1500 K. C. signal, and with the dial pointer set to 1500 K. C. as described on Page 262, adjust the pre-selector trimmer (Nos. 1, 2 and 3 in the H-1; the antenna trimmer, and Nos 2 and 3 trimmer in the H-2) and the oscillator trimmer for maximum reading on the output meter.

(b) Switch on the extra-strong 1500 K. C. signal and tune in its double-spot at 1240 K. C. Adjust the double-spot trimmer to give **minimum** response on the output meter.

(c) Switch on the normal-strength 1500 K. C. signal, tune the set to 1500 K. C. and re-adjust trimmer No. 3 for maximum output.

(d) Tune back to 1240 K. C., switch on the extra-strong 1500 K. C. signal, and re-adjust the double-spot trimmer for minimum output.

(e) Repeat the adjustments described in paragraphs (c) and (d) until, first, further adjustment of trimmer No. 3 does not increase the output of the normal 1500 K. C. signal, and, second, until further adjustment of the double-spot trimmer does not further decrease the response of the double-spot at 1240 K. C.

(Continued from Page 259)

Oscillator transformer. Mount exactly like the old one and re-adjust the oscillator trimmer and adjusting disc according to instructions on Pages 269 and 275.

1st-detector plate choke. Mount exactly like the old choke and re-adjust 1st-I. F. trimmer on 130 K. C. oscillator signal.

Variable condenser group. The eye is a good judge of whether or not the rotor plates are centered between the stator plates. If the rotors are not centered, install a complete new condenser. Do not attempt to adjust the rotor positions, nor the rotor bearings. When a new group is installed, repeat the entire R. F. synchronizing procedure.

EQUIPMENT REQUIRED FOR SERVICING TYPE H CHASSIS

In order to make the correct adjustments of trimmer condensers in Type H chassis, it is necessary to have the following equipment:

1. **A four-wave oscillator** providing modulated signals at 1,500, 1,000, 800 and 600 kilocycles. The oscillator signals must come in at exactly these settings on a Type H chassis that has been checked on "standard-frequency" broadcast stations to make certain that the dial calibration is accurate. In other words, the set is used as a wavemeter to check the frequency of the oscillator. In turn, the set must be checked frequently against "standard-frequency" broadcast stations.

The oscillator frequencies should be checked at least once a day, and more often if necessary.

Each oscillator in the four-wave oscillator must have an adjustable pick-up. Adjustment of any one pick-up must not affect the frequency of its oscillator, nor should it affect the volume of the other oscillators.

The 1500 K. C. oscillator must have an extra pick-up that may be cut in to provide an extra-strong 1500 K. C. signal, or cut out to provide a normal-strength 1500 K. C. signal. The extra-strong 1500 K. C. signal is used in adjusting the double-spot trimmer.

2. **A 130-kilocycle oscillator.** This should be tuned to 130 K. C. by adjusting its trimmers to give maximum output when this oscillator is coupled to the I. F. amplifier in a Type H chassis that has the original factory synchronism. The frequency of the 130-K. C. oscillator should be checked frequently.

The 130-K. C. oscillator may be coupled to the Type H chassis in either one of two different methods, as follows: (a) The oscillator may be completely shielded, with a shielded lead connecting an adjustable pick-up in the oscillator to the control-grid cap of the 1st-detector. (b) The oscillator may be mounted under the test bench in such a position that it will be close to the 1st-detector plate-circuit choke. A 2-inch hole should be drilled at this point in the metal plate that covers the test bench. In this case, of course, the bottom plate of the set should be removed.

3. **An output measuring circuit** such as that shown on Page 256 of the Service Manual.

4. **Two No. 18261 coil shields with the tops cut off.** These are used in place of the regular No. 18261 shields to cover the I. F. transformers in Type H-2 Chassis, in order to make the I. F. trimmer condensers accessible.

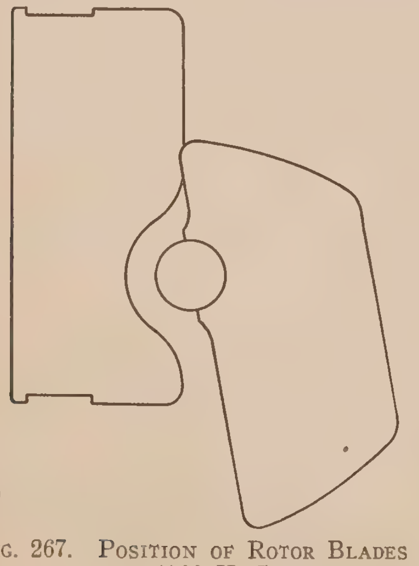
5. **One No. 17295 coil shield with a half-inch hole cut in the top.** This is used in place of the regular No. 17295 shield to cover No. 4 R. F. T., in order to make the double-spot trimmer accessible.

These specially cut shields are NOT supplied from the factory.

6. **One No. 15592 (black) tubular resistor** with a half-inch length of solid wire soldered to each end. This is used as described on Page 275.

7. **A trimmer-condenser screw-driver.** This should be made from a fibre rod about 10″ long and ¼″ in diameter.

INITIAL ADJUSTMENT OF ROTORS AND POINTER TO 1500 KILOCYCLES



㊵

Fig. 267. Position of Rotor Blades for 1500 K. C.

When the variable-condenser unit has been replaced or adjusted in any way, it is necessary to check the alignment as follows:—

Center the pointer on the control arm and tighten the pointer screws.

(1) Loosen the gear set-screws.

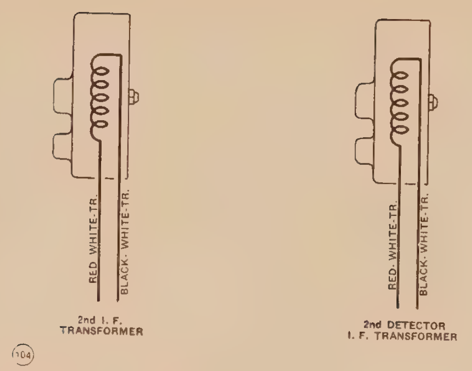
(2) Move the rotor plates to the position shown in Figure 267.

(3) With the rotor in this position, adjust the control arm to the 1500 K. C. position and tighten the gear set-screws.

(4) Note how far down on the 1500 K. C. mark the pointer comes, then turn the condenser knob to the 550 K. C. mark. The pointer should come down on this mark approximately the same as on the 1500 K. C. mark. If it does not, it is an indication that the front panel is not centered.

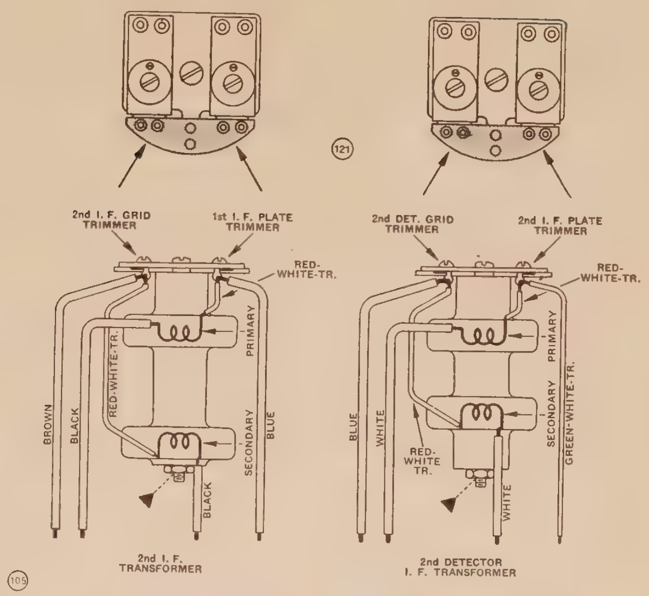
(5) If the front panel is not centered, loosen the screw at each end of the bottom of the front panel and shift the panel as necessary. Tighten the panel screws and then reset the control arm.

Connection of Units In Type H-1 and H-2 Chassis

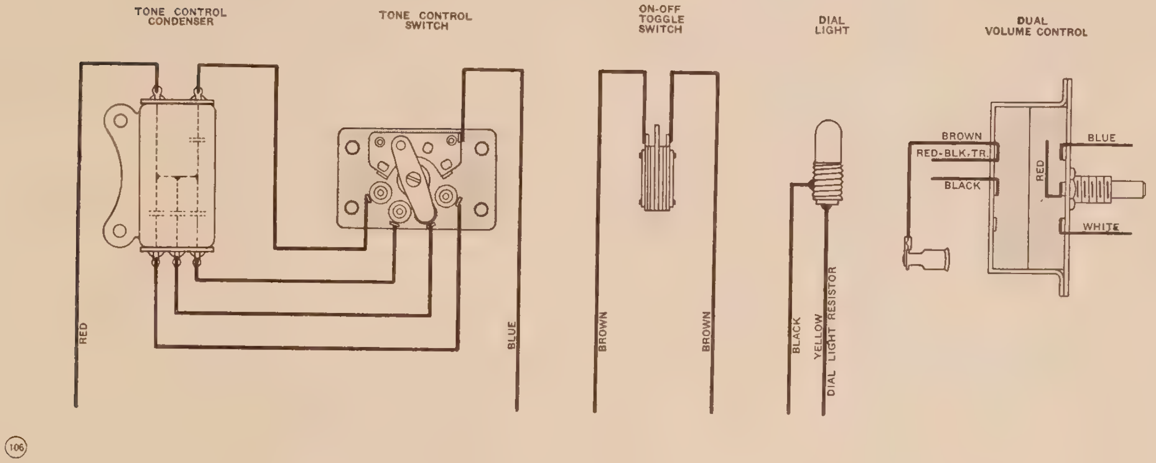

RED-WHITE-TR.
BLACK-WHITE-TR.
2nd I. F. TRANSFORMER
RED-WHITE-TR.
BLACK-WHITE-TR.
2nd DETECTOR I. F. TRANSFORMER
104

Intermediate-Frequency Transformers in Type H-1 Chassis

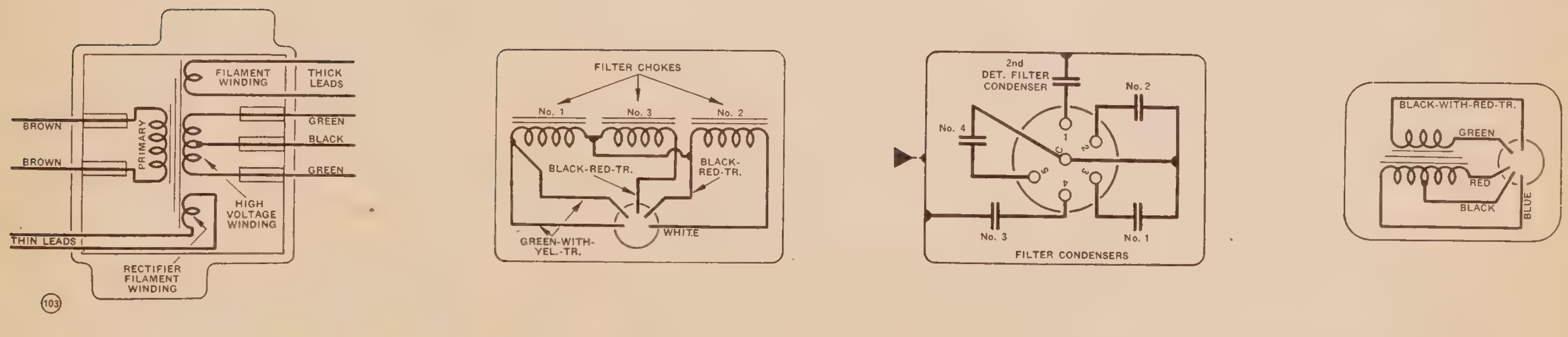
The leads on some of these transformers do not have white tracers.


121
2nd I. F. GRID TRIMMER
1st I. F. PLATE TRIMMER
RED-WHITE-TR.
BROWN
BLACK
RED-WHITE-TR.
PRIMARY
SECONDARY
BLUE
BLACK
2nd I. F. TRANSFORMER
105
2nd DET. GRID TRIMMER
2nd I. F. PLATE TRIMMER
RED-WHITE-TR.
BLUE
WHITE
RED-WHITE TR.
PRIMARY
SECONDARY
GREEN-WHITE-TR.
WHITE
2nd DETECTOR I. F. TRANSFORMER

Intermediate-Frequency Transformers in Type H-2 Chassis


TONE CONTROL CONDENSER
TONE CONTROL SWITCH
ON-OFF TOGGLE SWITCH
DIAL LIGHT
DUAL VOLUME CONTROL
RED
BLUE
BROWN
BROWN
BLACK
YELLOW
DIAL LIGHT RESISTOR
BROWN
RED-BLK-TR.
BLACK
RED
BLUE
WHITE
106

Panel Units in Type H-1 and H-2


FILAMENT WINDING
THICK LEADS
GREEN
BLACK
GREEN
BROWN
BROWN
PRIMARY
HIGH VOLTAGE WINDING
THIN LEADS
RECTIFIER FILAMENT WINDING
103
FILTER CHOKES
No. 1
No. 3
No. 2
BLACK-RED-TR.
BLACK-RED-TR.
GREEN-WITH-YEL.-TR.
WHITE
2nd DET. FILTER CONDENSER
No. 2
No. 4
No. 3
No. 1
FILTER CONDENSERS
BLACK-WITH-RED-TR.
GREEN
RED
BLACK
BLUE

POWER TRANSFORMER

FILTER-CHOKE UNIT

FILTER CONDENSER UNIT

2nd A. F. INPUT TRANSFORMER

Power Units and Audio Transformer in H-1 and H-2
Fig. 268

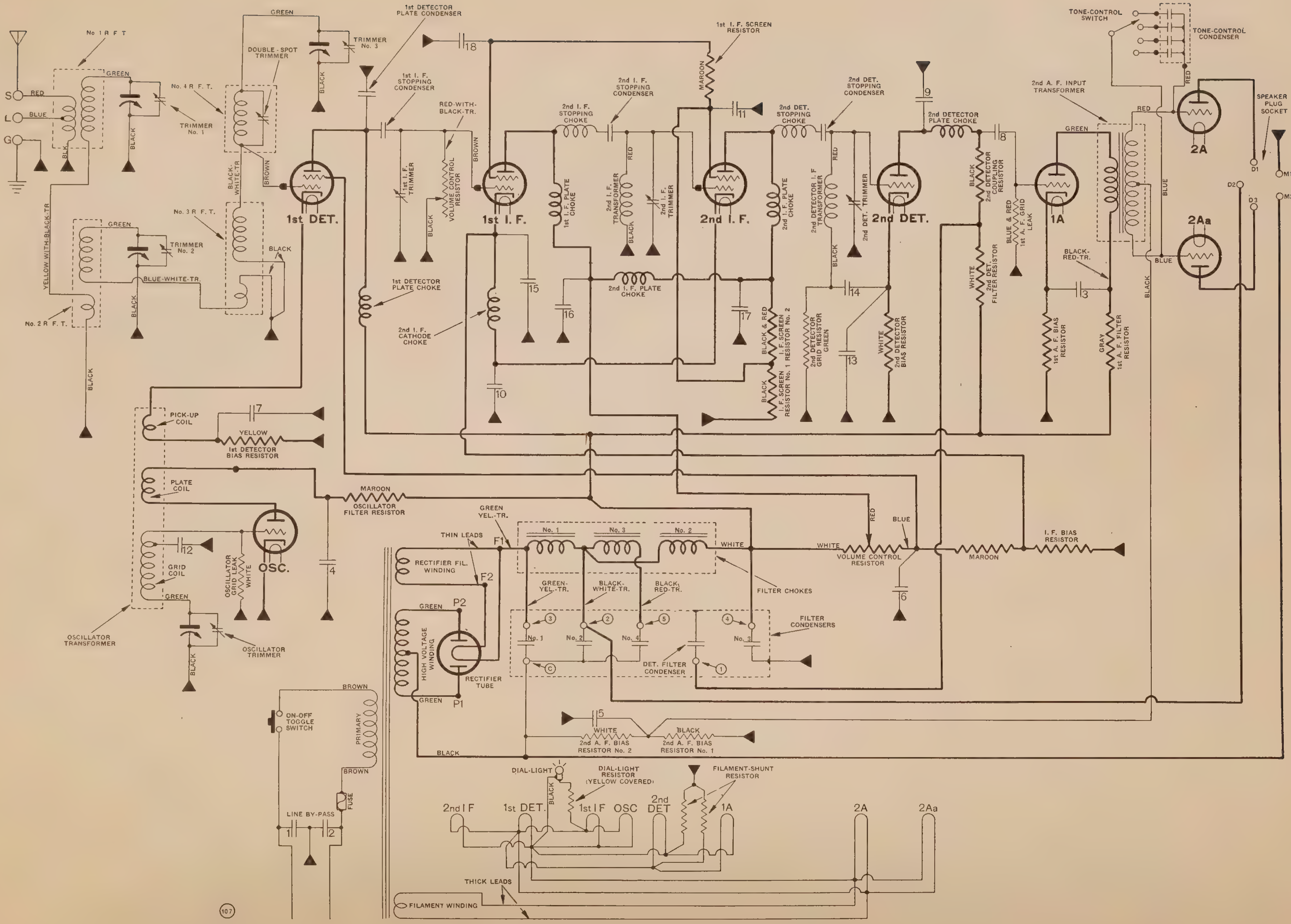

S
L
G
RED
BLUE
BLK
No 1 R F T
GREEN
BLACK
TRIMMER No. 1
No. 4 R F. T.
DOUBLE - SPOT TRIMMER
GREEN
TRIMMER No. 3
1st DETECTOR PLATE CONDENSER
18
BLACK-WHITE-TR.
BROWN
1st DET.
1st I. F. STOPPING CONDENSER
RED-WITH-BLACK-TR.
1st I. F. TRIMMER
VOLUME CONTROL RESISTOR
BLACK
BROWN
1st I. F.
1st I. F. SCREEN RESISTOR
MAROON
11
2nd I. F. STOPPING CHOKE
2nd I. F. STOPPING CONDENSER
1st I. F. PLATE CHOKE
2nd I. F. TRANSFORMER
RED
2nd I. F. TRIMMER
2nd I. F.
2nd DET. STOPPING CHOKE
2nd DET. STOPPING CONDENSER
2nd I. F. PLATE CHOKE
2nd DETECTOR I. F TRANSFORMER
2nd DET. TRIMMER
2nd DET.
9
2nd DETECTOR PLATE CHOKE
8
2nd DETECTOR COUPLING RESISTOR
BLUE & RED
1st A. F. GRID LEAK
1A
2nd A. F. INPUT TRANSFORMER
GREEN
RED
2A
2Aa
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
SPEAKER PLUG SOCKET
D1
D2
D3
M1
M2
YELLOW-WITH-BLACK-TR.
No. 3 R F. T.
TRIMMER No. 2
BLUE-WHITE-TR.
No. 2 R F. T.
1st DETECTOR PLATE CHOKE
2nd I. F. CATHODE CHOKE
15
16
10
2nd I. F. PLATE CHOKE
17
BLACK & RED
I. F. SCREEN RESISTOR No. 2
I. F. SCREEN RESISTOR No. 1
14
13
2nd DETECTOR GRID RESISTOR
WHITE
2nd DETECTOR BIAS RESISTOR
2nd DET. FILTER RESISTOR
1st A. F. BIAS RESISTOR
3
BLACK-RED-TR.
GRAY
1st A. F. FILTER RESISTOR
BLUE
PICK-UP COIL
7
YELLOW
1st DETECTOR BIAS RESISTOR
PLATE COIL
MAROON
OSCILLATOR FILTER RESISTOR
12
GRID COIL
OSCILLATOR GRID LEAK
OSC.
4
OSCILLATOR TRANSFORMER
OSCILLATOR TRIMMER
GREEN YEL.-TR.
THIN LEADS
F1
F2
RECTIFIER FIL. WINDING
No. 1
No. 3
No. 2
FILTER CHOKES
GREEN-YEL.-TR.
BLACK-WHITE-TR.
BLACK-RED-TR.
P2
P1
HIGH VOLTAGE WINDING
RECTIFIER TUBE
③
②
⑤
④
Ⓒ
①
No. 4
DET. FILTER CONDENSER
FILTER CONDENSERS
VOLUME CONTROL RESISTOR
6
I. F. BIAS RESISTOR
ON-OFF TOGGLE SWITCH
PRIMARY
FUSE
LINE BY-PASS
5
2nd A. F. BIAS RESISTOR No. 2
2nd A. F. BIAS RESISTOR No. 1
DIAL-LIGHT
DIAL-LIGHT RESISTOR (YELLOW COVERED)
FILAMENT-SHUNT RESISTOR
2nd I F
1st DET.
1st I F
OSC
2nd DET
THICK LEADS
FILAMENT WINDING
107

Fig. 269. Schematic Diagram of Type H-1 Chassis

For names of by-pass condensers, see Page 267.

In some Type H-1 sets the +B lead to the I. F. screens is connected to the 1st-I. F. side of the 1st-I. F. screen resistor.

VOLTAGE TABLE FOR TYPE H-1 CHASSIS

Set in operation. Volume control at maximum

Use High-Resistance D. C. Voltmeter (about 0-50-250) to Measure Plate and Grid Voltages. Use A. C. Voltmeter to Measure Filament Voltages

APPROX. VOLTAGES, USING 120 V. LINE

TYPE TUBE	POSITION IN SET	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
’24	1st-Det.	2.4	150	3	12
’27	Oscillator	2.3	100	10*	—
’24	1st-I. F.	2.3	150	3	75
’24	2nd-I. F.	2.3	145	3	85
’27	2nd-Det.	2.3	100	13**	—
’27	1st-A. F.	2.3	65	2	—
’45	2A	2.5	250	55*	—
’45	2Aa	2.5	250	55*	—
’80	Rectifier	4.7	—	--	—

With the volume control at minimum, the intermediate-frequency plate voltage is reduced to about 15 volts, and the I. F. screen voltage is reduced to about 10 volts.

* Use 250-volt scale.

** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

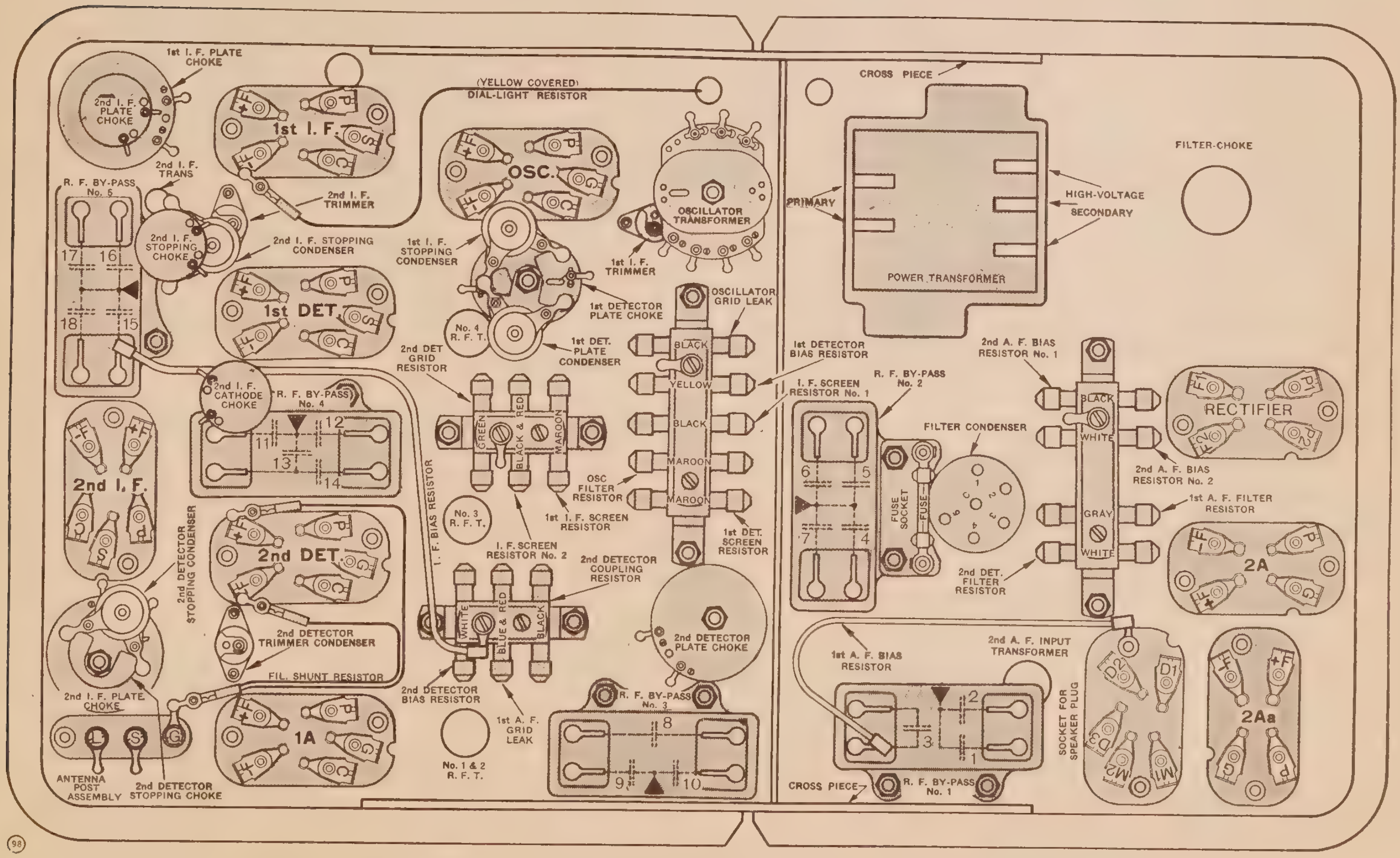

1st I. F. PLATE CHOKE
2nd I. F. PLATE CHOKE
2nd I. F. TRANS
R. F. BY-PASS No. 5
17
16
18
15
2nd I. F. STOPPING CHOKE
1st I. F.
2nd I. F. TRIMMER
2nd I. F. STOPPING CONDENSER
1st DET.
(YELLOW COVERED) DIAL-LIGHT RESISTOR
OSC.
1st I. F. STOPPING CONDENSER
OSCILLATOR TRANSFORMER
1st I. F. TRIMMER
1st DETECTOR PLATE CHOKE
OSCILLATOR GRID LEAK
No. 4 R. F. T.
1st DET. PLATE CONDENSER
2nd DET GRID RESISTOR
2nd I. F. CATHODE CHOKE
R. F. BY-PASS No. 4
11
12
13
14
GREEN
BLACK & RED
MAROON
BLACK
YELLOW
BLACK
MAROON
MAROON
OSC FILTER RESISTOR
1st I. F. SCREEN RESISTOR
1st DET. SCREEN RESISTOR
2nd I. F.
I. F. BIAS RESISTOR
No. 3 R. F. T.
I. F. SCREEN RESISTOR No. 2
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR STOPPING CONDENSER
2nd DET.
2nd DETECTOR TRIMMER CONDENSER
FIL. SHUNT RESISTOR
WHITE
BLUE & RED
BLACK
2nd DETECTOR BIAS RESISTOR
1st A. F. GRID LEAK
No. 1 & 2 R. F. T.
2nd DETECTOR PLATE CHOKE
R. F. BY-PASS No. 3
8
9
10
2nd I. F. PLATE CHOKE
L
S
G
1A
ANTENNA POST ASSEMBLY
2nd DETECTOR STOPPING CHOKE
CROSS PIECE
PRIMARY
POWER TRANSFORMER
HIGH-VOLTAGE SECONDARY
FILTER-CHOKE
1st DETECTOR BIAS RESISTOR
I. F. SCREEN RESISTOR No. 1
R. F. BY-PASS No. 2
2nd A. F. BIAS RESISTOR No. 1
BLACK
WHITE
RECTIFIER
F1
P1
F2
P2
2nd A. F. BIAS RESISTOR No. 2
FILTER CONDENSER
6
5
7
4
FUSE SOCKET
FUSE
GRAY
WHITE
1st A. F. FILTER RESISTOR
2A
2nd DET. FILTER RESISTOR
1st A. F. BIAS RESISTOR
2nd A. F. INPUT TRANSFORMER
2
3
1
SOCKET FOR SPEAKER PLUG
D1
D2
D3
M1
M2
2Aa
CROSS PIECE
R. F. BY-PASS No. 1
98

FIG. 270. BOTTOM CHART OF TYPE H-1 CHASSIS

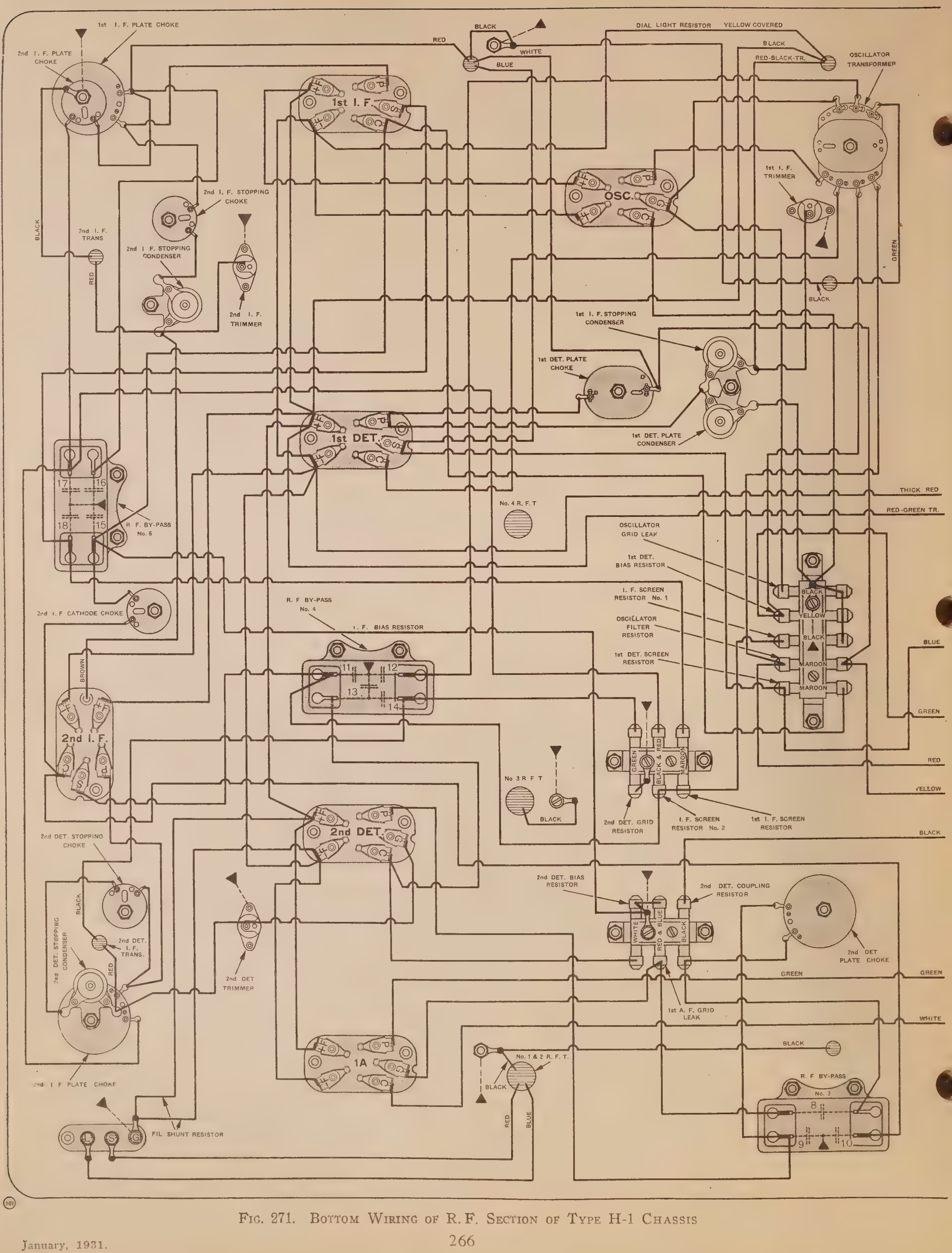

1st I. F. PLATE CHOKE
2nd I. F. PLATE CHOKE
BLACK
RED
WHITE
BLUE
DIAL LIGHT RESISTOR
YELLOW COVERED
RED-BLACK-TR.
OSCILLATOR TRANSFORMER
1st I. F.
P
S
G
F
OSC.
1st I. F. TRIMMER
2nd I. F. STOPPING CHOKE
2nd I. F. TRANS
2nd I. F. STOPPING CONDENSER
2nd I. F. TRIMMER
GREEN
1st I. F. STOPPING CONDENSER
1st DET. PLATE CHOKE
1st DET. PLATE CONDENSER
1st DET.
17
16
18
15
R. F. BY-PASS No. 5
No. 4 R. F. T
THICK RED
RED-GREEN TR.
OSCILLATOR GRID LEAK
1st DET. BIAS RESISTOR
I. F. SCREEN RESISTOR No. 1
OSCILLATOR FILTER RESISTOR
1st DET. SCREEN RESISTOR
YELLOW
MAROON
2nd I. F CATHODE CHOKE
R. F BY-PASS No. 4
I. F. BIAS RESISTOR
11
12
13
14
BROWN
2nd I. F.
No 3 R F T
2nd DET. GRID RESISTOR
I. F. SCREEN RESISTOR No. 2
1st I. F. SCREEN RESISTOR
BLACK & RED
2nd DET. STOPPING CHOKE
2nd DET.
2nd DET. BIAS RESISTOR
2nd DET. COUPLING RESISTOR
2nd DET. I. F. TRANS.
2nd DET. STOPPING CONDENSER
2nd DET TRIMMER
RED & BLUE
2nd DET PLATE CHOKE
1st A. F. GRID LEAK
1A
No. 1 & 2 R. F. T.
R. F BY-PASS No. 3
8
9
10
2nd I F PLATE CHOKE
FIL SHUNT RESISTOR
L
S
G
(191)

Fig. 271. Bottom Wiring of R. F. Section of Type H-1 Chassis

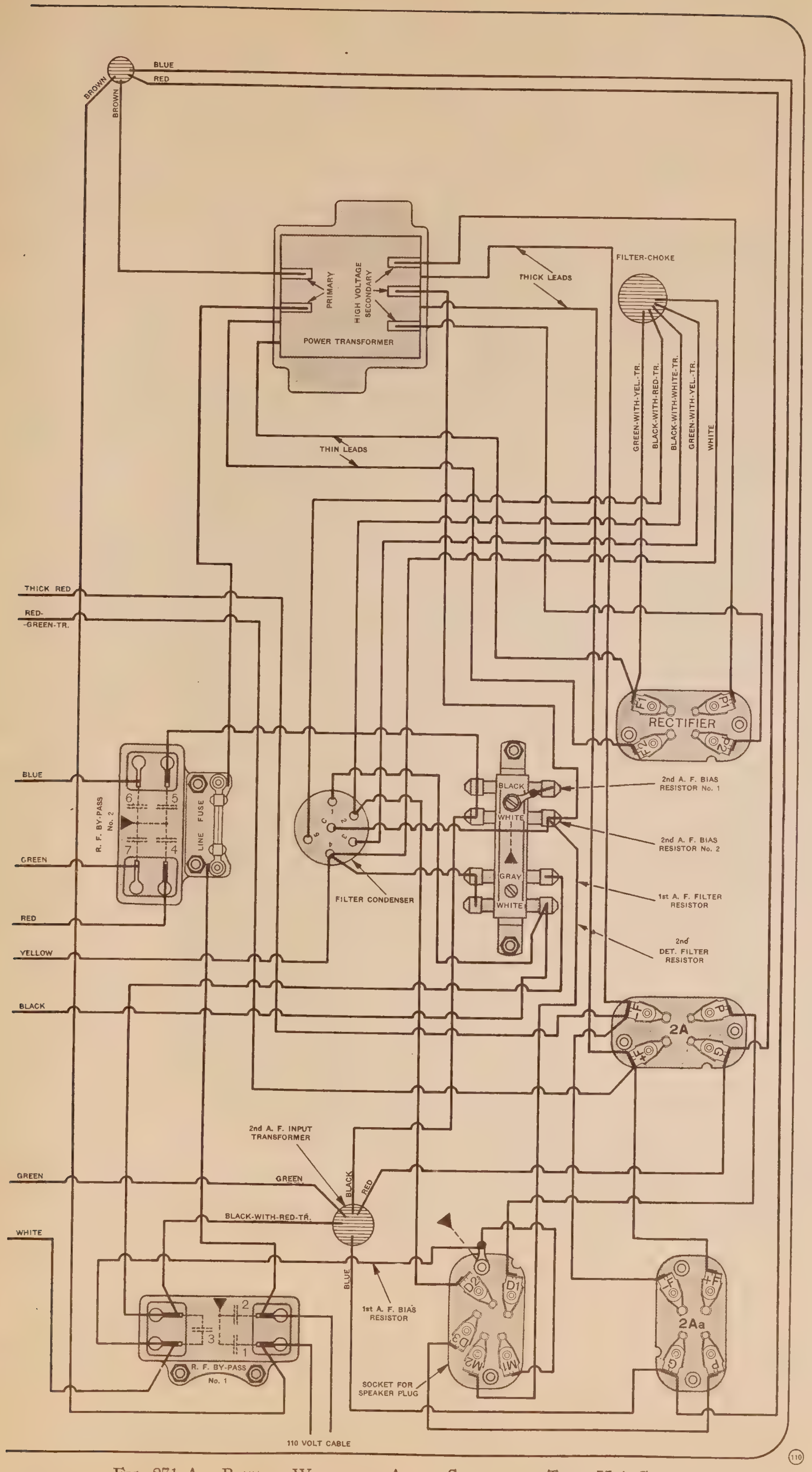

BLUE
RED
BROWN
BROWN
PRIMARY
HIGH VOLTAGE SECONDARY
POWER TRANSFORMER
THICK LEADS
FILTER-CHOKE
GREEN-WITH-YEL.-TR.
BLACK-WITH-RED-TR.
BLACK-WITH-WHITE-TR.
GREEN-WITH-YEL.-TR.
WHITE
THIN LEADS
THICK RED
RED-
-GREEN-TR.
RECTIFIER
F1
P1
F2
P2
BLUE
R. F. BY-PASS No. 2
LINE FUSE
GREEN
RED
YELLOW
BLACK
FILTER CONDENSER
BLACK
WHITE
GRAY
WHITE
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS RESISTOR No. 2
1st A. F. FILTER RESISTOR
2nd DET. FILTER RESISTOR
2A
2nd A. F. INPUT TRANSFORMER
GREEN
GREEN
BLACK
RED
BLACK-WITH-RED-TR.
WHITE
BLUE
1st A. F. BIAS RESISTOR
R. F. BY-PASS No. 1
SOCKET FOR SPEAKER PLUG
D1
D2
D3
M1
M2
2Aa
110 VOLT CABLE
110

Fig. 271-A. Bottom Wiring of Audio Section of Type H-1 Chassis

By-pass Condensers in Type H-1 Chassis

R. F. By-Pass No. 1

1—Line by-pass.
2—Line by-pass.
3—1st-A. F. filter condenser.

R. F. By-Pass No. 2

4—Oscillator filter condenser.
5—2nd-A. F. bias by-pass.
6—1st-detector screen by-pass.
7—1st-detector bias by-pass.

R. F. By-Pass No. 3

8—Detector—1st-A. F. coupling condenser.
9—Phone condenser.
10—2nd-I. F. cathode by-pass.

R. F. By-pass No. 4*

11—2nd-I. F. screen by-pass.
12—Oscillator grid condenser.
13—2nd-detector bias by-pass.
14—2nd-detector grid-circuit by-pass.

R. F. By-Pass No. 5

15—I. F. bias by-pass.
16—I. F. plate-circuit by-pass.
17—2nd-I. F. plate-circuit by-pass.
18—1st-I. F. screen by-pass.

* This condenser should have code mark H-25. Do not use an H-26.

TYPE H-1, No. 16500, SUPER-HETERODYNE CHASSIS

(Below Serial No. 5,855,201)

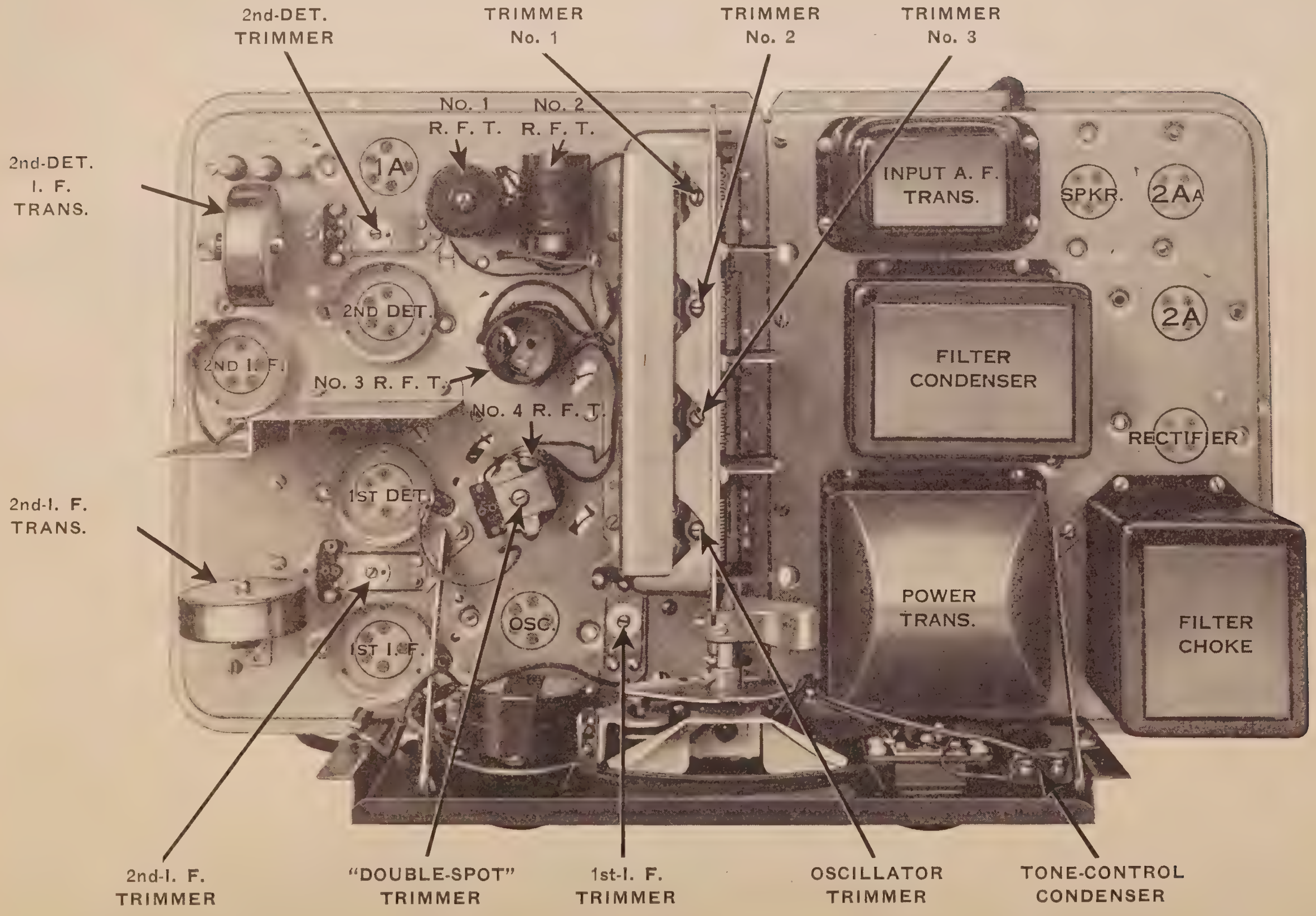

2nd-DET.
TRIMMER
TRIMMER No. 1
TRIMMER No. 2
TRIMMER No. 3
No. 1 R. F. T.
No. 2 R. F. T.
2nd-DET. I. F. TRANS.
1A
INPUT A. F. TRANS.
SPKR.
2AA
2ND DET.
2ND I. F.
No. 3 R. F. T.
No. 4 R. F. T.
FILTER CONDENSER
2A
RECTIFIER
1ST DET.
2nd-I. F. TRANS.
OSC.
1ST I. F.
POWER TRANS.
FILTER CHOKE
2nd-I. F. TRIMMER
"DOUBLE-SPOT" TRIMMER
1st-I. F. TRIMMER
OSCILLATOR TRIMMER
TONE-CONTROL CONDENSER

Fig. 272. Top View of Atwater Kent Type H-1 Super-Heterodyne Chassis

ADJUSTING TRIMMERS ON TYPE H-1 CHASSIS

Make Adjustments In Order Listed

Read Instructions on Pages 259 and 262

Preliminary

(a) Couple the 130 K. C. oscillator to the set. See Section 2, Page 262.

(b) Connect the common pick-up lead from the four-wave oscillator to one end of a No. 8112 condenser. Connect the other end of this condenser to the Long-Antenna post. Connect the oscillator container to the Ground post.

(c) Connect the output measuring circuit shown on Page 256 to the speaker-plug socket on the set. Close S2 and S3. Throw S1 to the left. Put S4 on the second tap.

(d) Put all tubes in the set. Break away the sealing wax on the trimmer-condenser screws.

(e) Put special coil shield on No. 4 R. F. T. so the double-spot trimmer is accessible.

(f) Make initial adjustment of rotors and dial pointer to 1500 K. C. as described on Page 262.

I. F. Trimmers

(g) Switch on the set and the 130 K. C. oscillator. Adjust the 2nd-I. F. trimmer for maximum output. Keep meter reading about 50 by regulating volume control on set.

(h) Adjust the 2nd-detector trimmer for maximum output. Do not touch the 1st-I. F. trimmer unless the I. F. amplifier is unstable. In this case, turn the adjusting screw of this trimmer anti-clockwise until the amplifier becomes stable. Turn off the 130 K. C. oscillator.

Oscillator Trimmers

(i) Tune in the 1500 K. C. signal and adjust the oscillator trimmer to bring in this signal at exactly 150 on the dial.

(j) Adjust the **pre-selector trimmers** Nos. 1, 2 and 3 for maximum output.

(k) Turn dial pointer exactly to 80. Screw the oscillator-transformer adjusting disc in or out as necessary to the point that gives maximum output from the 800 K. C. signal.

(l) Turn dial pointer to 150. Re-set the oscillator trimmer to give maximum output from the 1500 K. C. signal.

(m) Turn dial pointer to 80. Re-set the disc for maximum output.

(n) Turn dial pointer **exactly** to 150. Adjust the oscillator trimmer for maximum reading.

(o) Repeat operations (m) and (n) if necessary. The object of this procedure is to bring in both the 1500 K. C. and the 800 K. C. signals at exactly the correct points on the dial; 150 and 80 respectively.

Double-Spot Trimmers

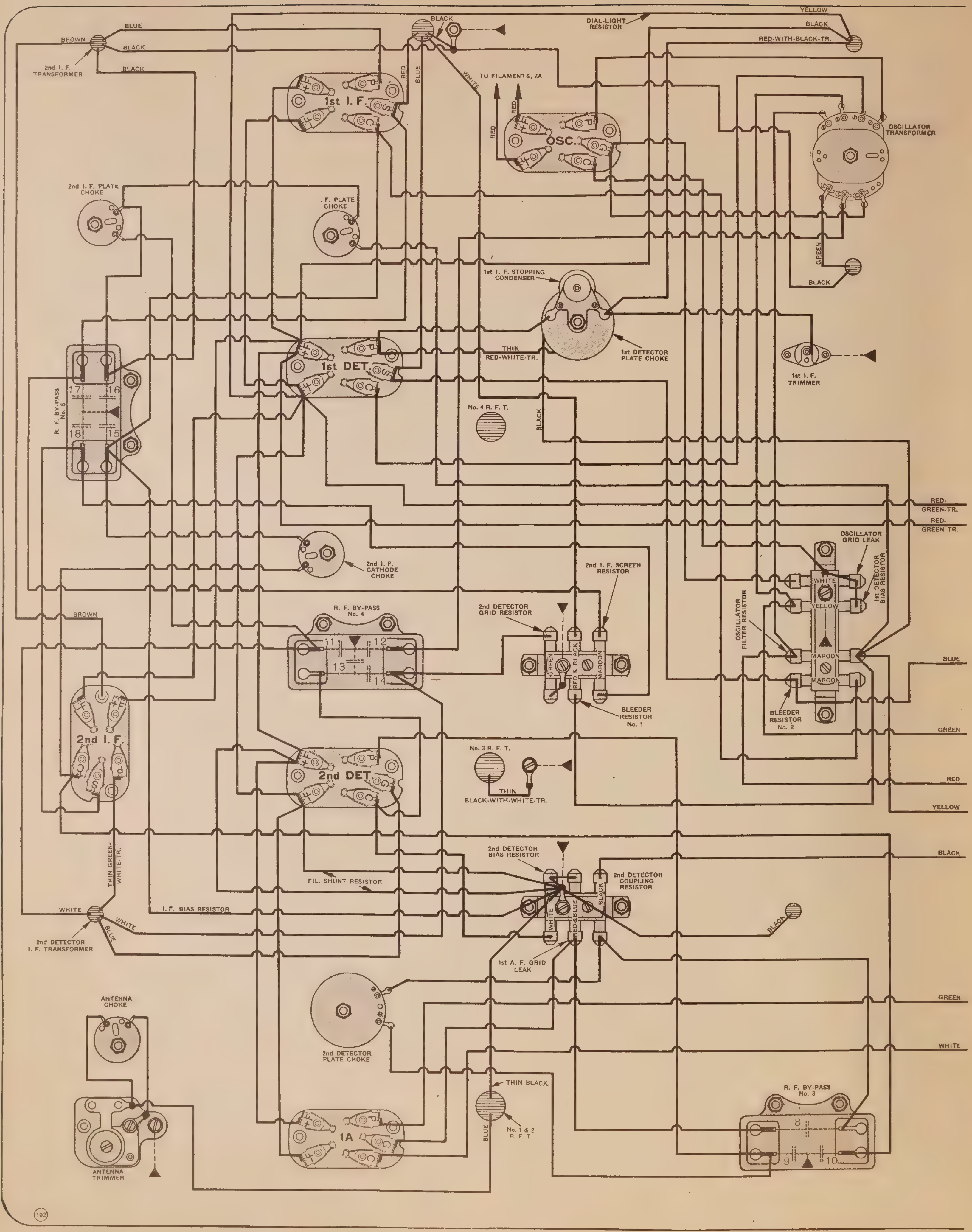
(p) Switch on the extra-strong 1500 K. C. signal and tune in its double-spot at 1240 K. C. Adjust the double-spot trimmer to give **minimum output.**

(q) Switch on the normal-strength 1500 K. C. signal and tune it in at 150. Adjust trimmer No. 3 to give maximum output.

(r) Repeat the instructions given in paragraphs (p) and (q) until further adjustment gives no change in output.

1st-I. F. Trimmer

(s) Tune in the 1000 K. C. signal and adjust the 1st-I. F. trimmer for maximum audible output with the volume control full on. If the I. F. amplifier is unstable, screw the 1st-I. F. trimmer anti-clockwise to a stable position.
Re-seal the trimmer screws.



2nd I. F. TRANSFORMER
BROWN
BLUE
BLACK
BLACK
BLACK
RED
BLUE
WHITE
1st I. F.
P
G
S
F
F
DIAL-LIGHT RESISTOR
YELLOW
BLACK
RED-WITH-BLACK-TR.
TO FILAMENTS, 2A
RED
RED
OSC.
OSCILLATOR TRANSFORMER
2nd I. F. PLATE CHOKE
. F. PLATE CHOKE
GREEN
BLACK
1st I. F. STOPPING CONDENSER
THIN RED-WHITE-TR.
1st DETECTOR PLATE CHOKE
1st I. F. TRIMMER
R. F. BY-PASS No. 5
17
16
18
15
1st DET.
No. 4 R. F. T.
BLACK
RED-GREEN-TR.
RED-GREEN TR.
2nd I. F. CATHODE CHOKE
2nd I. F. SCREEN RESISTOR
OSCILLATOR GRID LEAK
1st DETECTOR BIAS RESISTOR
WHITE
YELLOW
OSCILLATOR FILTER RESISTOR
MAROON
MAROON
BLEEDER RESISTOR No. 2
BROWN
R. F. BY-PASS No. 4
11
12
13
14
2nd DETECTOR GRID RESISTOR
GREEN
BLACK
RED & BLACK
MAROON
BLEEDER RESISTOR No. 1
BLUE
GREEN
2nd I. F.
No. 3 R. F. T.
THIN BLACK-WITH-WHITE-TR.
2nd DET.
RED
YELLOW
THIN GREEN-WHITE-TR.
2nd DETECTOR BIAS RESISTOR
2nd DETECTOR COUPLING RESISTOR
FIL. SHUNT RESISTOR
BLACK
WHITE
RED&BLUE
BLACK
BLACK
WHITE
I. F. BIAS RESISTOR
WHITE
BLUE
2nd DETECTOR I. F. TRANSFORMER
1st A. F. GRID LEAK
GREEN
WHITE
ANTENNA CHOKE
2nd DETECTOR PLATE CHOKE
THIN BLACK
ANTENNA TRIMMER
1A
BLUE
No. 1 & 2 R. F. T.
R. F. BY-PASS No. 3
8
9
10
102

Fig. 273. Bottom Wiring of R. F. Section of Type H-2 Chassis

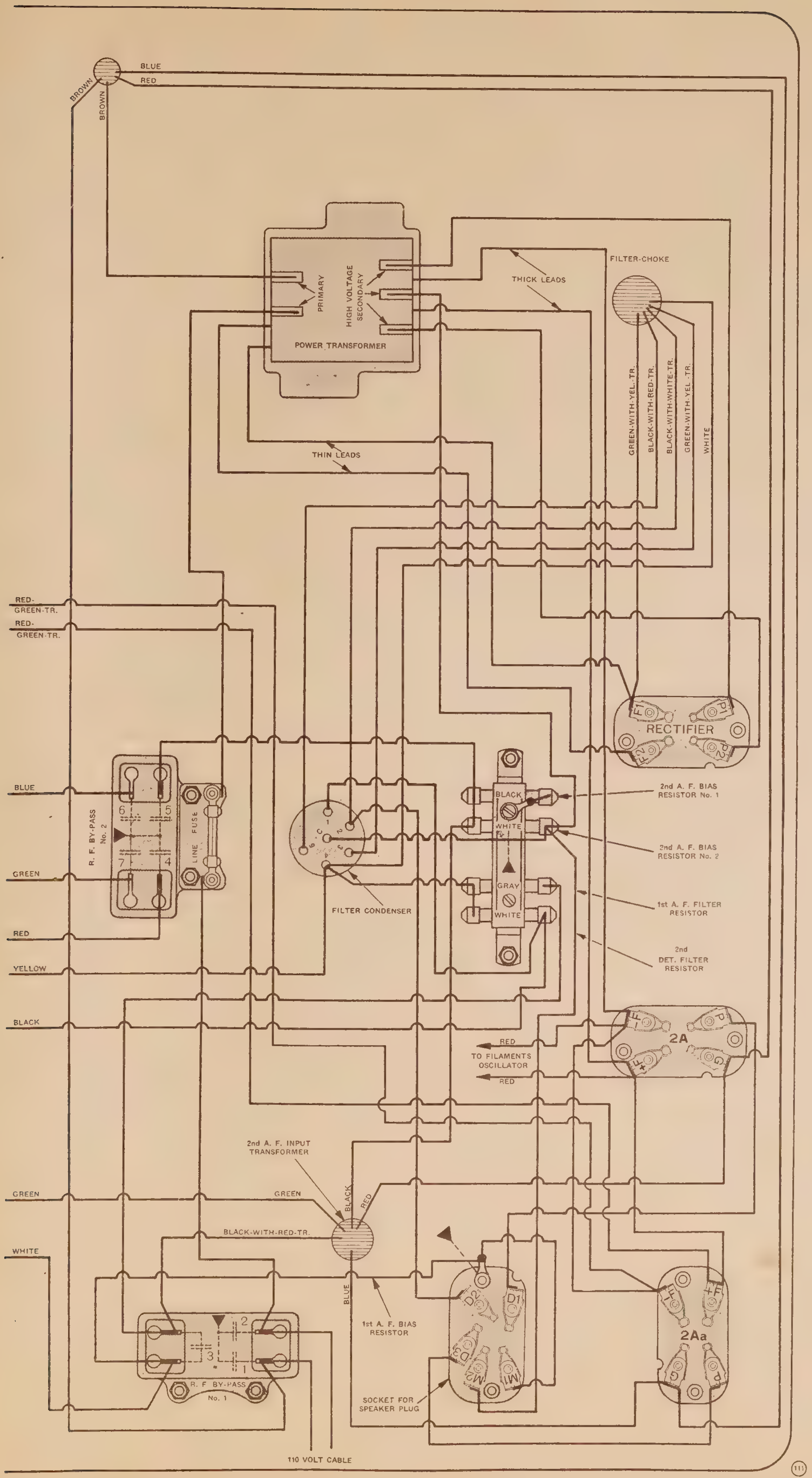

BLUE
RED
BROWN
BROWN
PRIMARY
HIGH VOLTAGE SECONDARY
POWER TRANSFORMER
THICK LEADS
FILTER-CHOKE
GREEN-WITH-YEL. TR.
BLACK-WITH-RED-TR.
BLACK-WITH-WHITE-TR.
GREEN-WITH-YEL.-TR.
WHITE
THIN LEADS
RED-GREEN-TR.
RED-GREEN-TR.
BLUE
R. F. BY-PASS No. 2
6
5
7
4
LINE FUSE
GREEN
RED
YELLOW
BLACK
FILTER CONDENSER
BLACK
WHITE
GRAY
WHITE
F1
P1
RECTIFIER
F2
P2
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS RESISTOR No. 2
1st A. F. FILTER RESISTOR
2nd DET. FILTER RESISTOR
-F
P
2A
+F
G
RED
TO FILAMENTS OSCILLATOR
RED
2nd A. F. INPUT TRANSFORMER
GREEN
GREEN
BLACK
RED
BLACK-WITH-RED-TR.
WHITE
BLUE
1st A. F. BIAS RESISTOR
2
3
1
R. F. BY-PASS No. 1
SOCKET FOR SPEAKER PLUG
D2
D1
D3
M2
M1
-F
+F
2Aa
G
P
110 VOLT CABLE

Fig. 273-A. Bottom Wiring of Audio Section of Type H-2 Chassis

By-pass Condensers in Type H-2 Chassis

R. F. By-Pass No. 1

1—Line by-pass.
2—Line by-pass.
3—1st-A. F. filter condenser.

R. F. By-Pass No. 2

4—Oscillator filter condenser.
5—2nd-A. F. bias by-pass.
6—1st-detector screen by-pass.
7—1st-detector bias by-pass.

R. F. By-Pass No. 3

8—Detector—1st-A. F. coupling condenser.
9—Phone condenser.
10—2nd-I. F. cathode by-pass.

R. F. By-pass No. 4*

11—2nd-I. F. plate by-pass.
12—Oscillator grid condenser.
13—2nd-detector bias by-pass.
14—2nd-detector grid-circuit by-pass.

R. F. By-Pass No. 5

15—I. F. bias by-pass.
16—I. F. plate-circuit by-pass.
17—1st-I. F. screen by-pass.
18—2nd-I. F. screen by-pass.

* This condenser should have code mark H-25. Do not use an H-26.

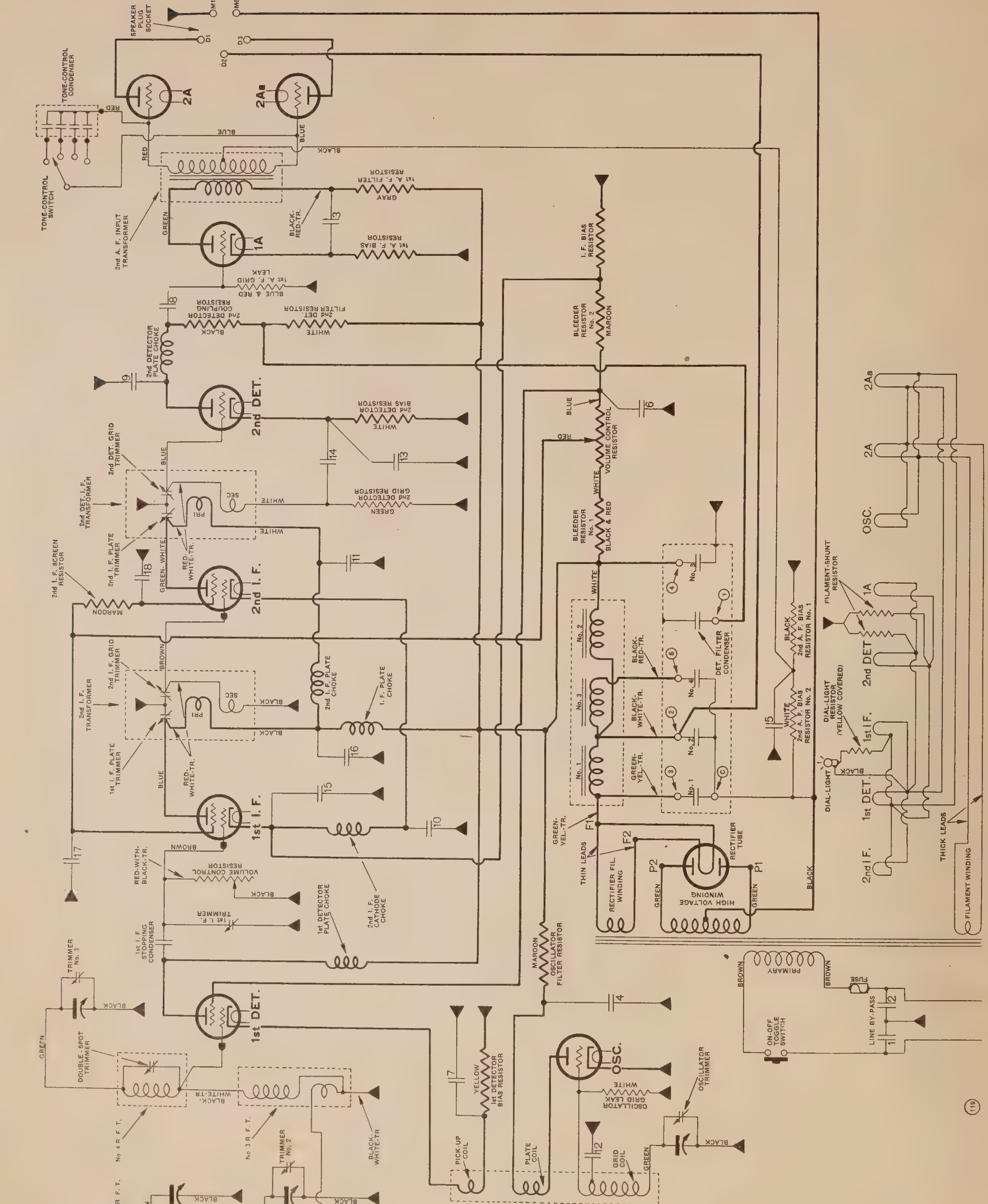

SPEAKER PLUG SOCKET
M1
M2
D1
D2
D3
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
RED
BLUE
BLACK
2A
2Aa
2nd A. F. INPUT TRANSFORMER
GREEN
1st A. F. FILTER RESISTOR
GRAY
BLACK-RED-TR.
3
1st A. F. BIAS RESISTOR
1A
1st A. F. GRID LEAK
BLUE & RED
8
2nd DETECTOR COUPLING RESISTOR
2nd DET. FILTER RESISTOR
WHITE
2nd DETECTOR PLATE CHOKE
9
2nd DET.
2nd DETECTOR BIAS RESISTOR
13
14
2nd DET. GRID TRIMMER
2nd DET. I. F. TRANSFORMER
SEC
PRI
2nd DETECTOR GRID RESISTOR
2nd I. F. PLATE TRIMMER
RED-WHITE-TR.
GREEN-WHITE
18
11
2nd I. F. SCREEN RESISTOR
MAROON
2nd I. F.
BROWN
2nd I. F. GRID TRIMMER
2nd I. F. TRANSFORMER
2nd I. F. PLATE CHOKE
I. F. PLATE CHOKE
1st I. F. PLATE TRIMMER
16
15
10
1st I. F.
17
RED-WITH-BLACK-TR.
VOLUME CONTROL RESISTOR
1st I. F. TRIMMER
1st I. F. STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
2nd I. F. CATHODE CHOKE
TRIMMER No. 3
1st DET.
DOUBLE-SPOT TRIMMER
BLACK-WHITE-TR.
No 4 R F T.
No 3 R F T.
TRIMMER No. 2
No 1 R F T.
ANTENNA CHOKE
ANTENNA TRIMMER
A
G
GREEN-WHITE-TR.
BLACK WITH-WHITE-TR.
No 2 R F T.
7
YELLOW
1st DETECTOR BIAS RESISTOR
PICK-UP COIL
PLATE COIL
GRID COIL
OSCILLATOR TRANSFORMER
12
OSC.
OSCILLATOR GRID LEAK
OSCILLATOR TRIMMER
4
OSCILLATOR FILTER RESISTOR
I. F. BIAS RESISTOR
BLEEDER RESISTOR No. 2
6
BLEEDER RESISTOR No. 1
BLACK & RED
No. 1
No. 2
No. 3
① ② ③ ④ ⑤ ⑥ Ⓒ
DET. FILTER CONDENSER
BLACK-WHITE-TR.
GREEN-YEL-TR.
F1
F2
THIN LEADS
RECTIFIER FIL. WINDING
HIGH VOLTAGE WINDING
RECTIFIER TUBE
P1
P2
5
2nd A. F. BIAS RESISTOR No. 1
2nd A. F. BIAS RESISTOR No. 2
PRIMARY
FUSE
ON-OFF TOGGLE SWITCH
LINE BY-PASS
1
2
DIAL-LIGHT RESISTOR (YELLOW COVERED)
DIAL-LIGHT
FILAMENT-SHUNT RESISTORS
THICK LEADS
FILAMENT WINDING
2nd I F.
1st I F.
2nd DET
116

FIG. 274. SCHEMATIC DIAGRAM OF TYPE H-2 CHASSIS
For names of by-pass condensers see Page 271.

VOLTAGE TABLE FOR TYPE H-2 CHASSIS

Set in operation. Volume control at maximum

Use High-Resistance D. C. Voltmeter to Measure Plate and Grid Voltages
Use A. C. Voltmeter to Measure Filament Voltages

APPROX. VOLTAGES, USING 120 V. LINE

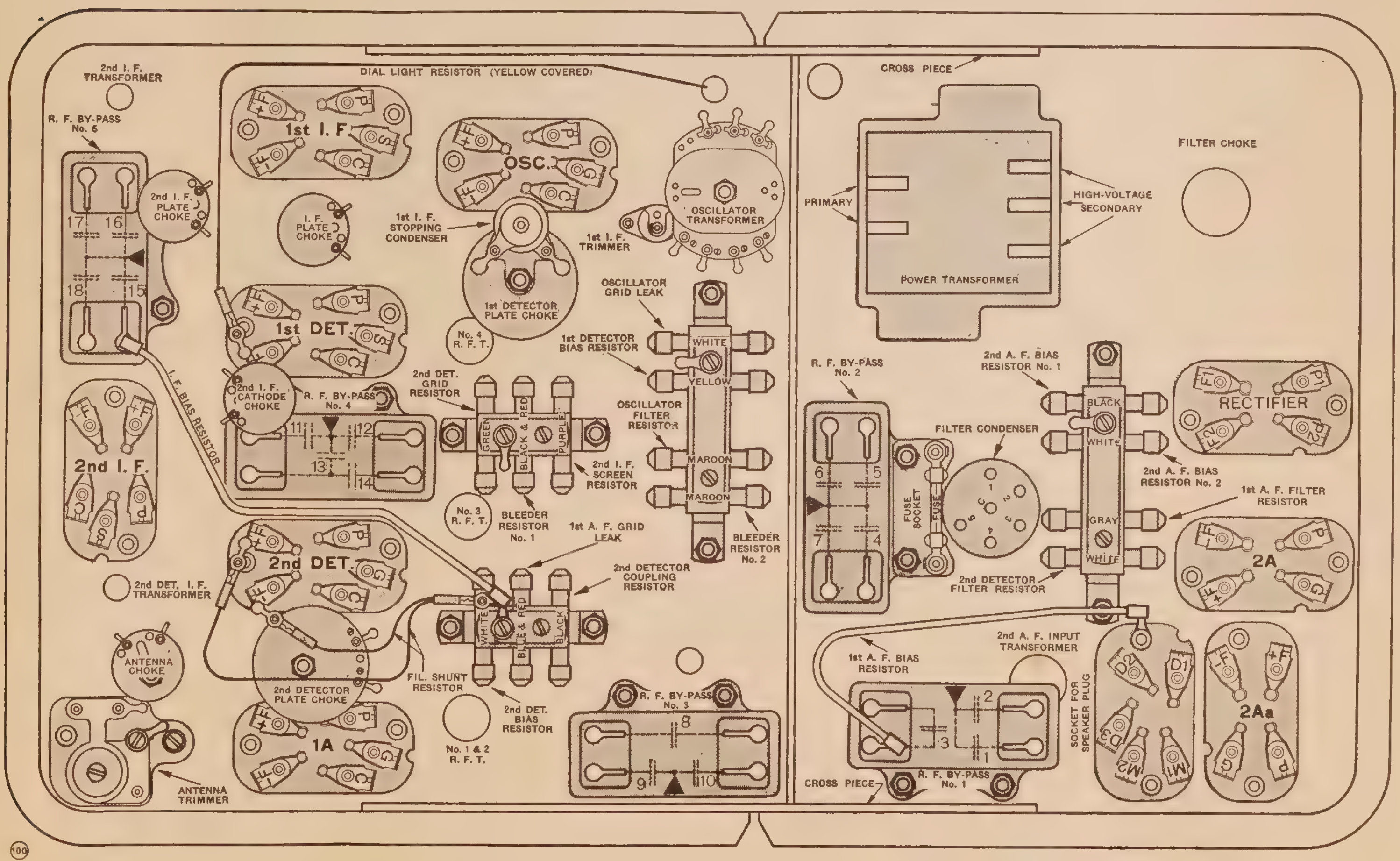
TYPE TUBE	POSITION IN SET	FILAMENT VOLTAGE	PLATE VOLTAGE	CONTROL-GRID VOLTAGE	SCREEN VOLTAGE
'24	1st-Det.	2.3	150	4	15
'27	Oscillator	2.5	130	10*	—
'24	1st-I. F.	2.3	150	3.5	100
'24	2nd-I. F.	2.3	150	3.5	85
'27	2nd-Det.	2.3	100	14**	—
'27	1st-A. F.	2.3	70	2	—
'45	2A	2.5	250	55*	—
'45	2Aa	2.5	250	55*	—
'80	Rectifier	4.7	—	—	—

With the volume control at minimum, the I. F. screen voltage is reduced to about 15 volts.

* Use 250-volt scale.

** This is the voltage across the detector bias resistor; when measuring from grid to cathode, the voltage reading is only 2.

All readings made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.


2nd I. F. TRANSFORMER
R. F. BY-PASS No. 5
2nd I. F. PLATE CHOKE
17
16
18
15
DIAL LIGHT RESISTOR (YELLOW COVERED)
1st I. F.
+F
-F
P
S
C
OSC.
G
I. F. PLATE CHOKE
1st I. F. STOPPING CONDENSER
1st I. F. TRIMMER
OSCILLATOR TRANSFORMER
1st DETECTOR PLATE CHOKE
OSCILLATOR GRID LEAK
1st DET.
No. 4 R. F. T.
1st DETECTOR BIAS RESISTOR
WHITE
YELLOW
2nd I. F. CATHODE CHOKE
R. F. BY-PASS No. 4
I. F. BIAS RESISTOR
11
12
13
14
2nd DET. GRID RESISTOR
GREEN
BLACK & RED
PURPLE
OSCILLATOR FILTER RESISTOR
MAROON
MAROON
2nd I. F. SCREEN RESISTOR
2nd I. F.
No. 3 R. F. T.
BLEEDER RESISTOR No. 1
1st A. F. GRID LEAK
BLEEDER RESISTOR No. 2
2nd DET.
2nd DETECTOR COUPLING RESISTOR
2nd DET. I. F. TRANSFORMER
WHITE
BLUE & RED
BLACK
ANTENNA CHOKE
FIL. SHUNT RESISTOR
2nd DETECTOR PLATE CHOKE
2nd DET. BIAS RESISTOR
No. 1 & 2 R. F. T.
R. F. BY-PASS No. 3
8
9
10
1A
ANTENNA TRIMMER
CROSS PIECE
FILTER CHOKE
PRIMARY
HIGH-VOLTAGE SECONDARY
POWER TRANSFORMER
R. F. BY-PASS No. 2
2nd A. F. BIAS RESISTOR No. 1
BLACK
WHITE
RECTIFIER
F1
P1
F2
P2
FILTER CONDENSER
6
5
7
4
FUSE SOCKET
FUSE
2nd A. F. BIAS RESISTOR No. 2
1st A. F. FILTER RESISTOR
GRAY
WHITE
2A
2nd DETECTOR FILTER RESISTOR
2nd A. F. INPUT TRANSFORMER
1st A. F. BIAS RESISTOR
2
3
1
SOCKET FOR SPEAKER PLUG
D1
D2
D3
M1
M2
2Aa
CROSS PIECE
R. F. BY-PASS No. 1

(100)

Fig. 275. Bottom View of Type H-2 Chassis
In this chart, the 2nd-I. F. screen resistor should be maroon instead of purple.

TYPE H-2, No. 16500, SUPER-HETERODYNE CHASSIS

(Above Serial No. 5,855,201)

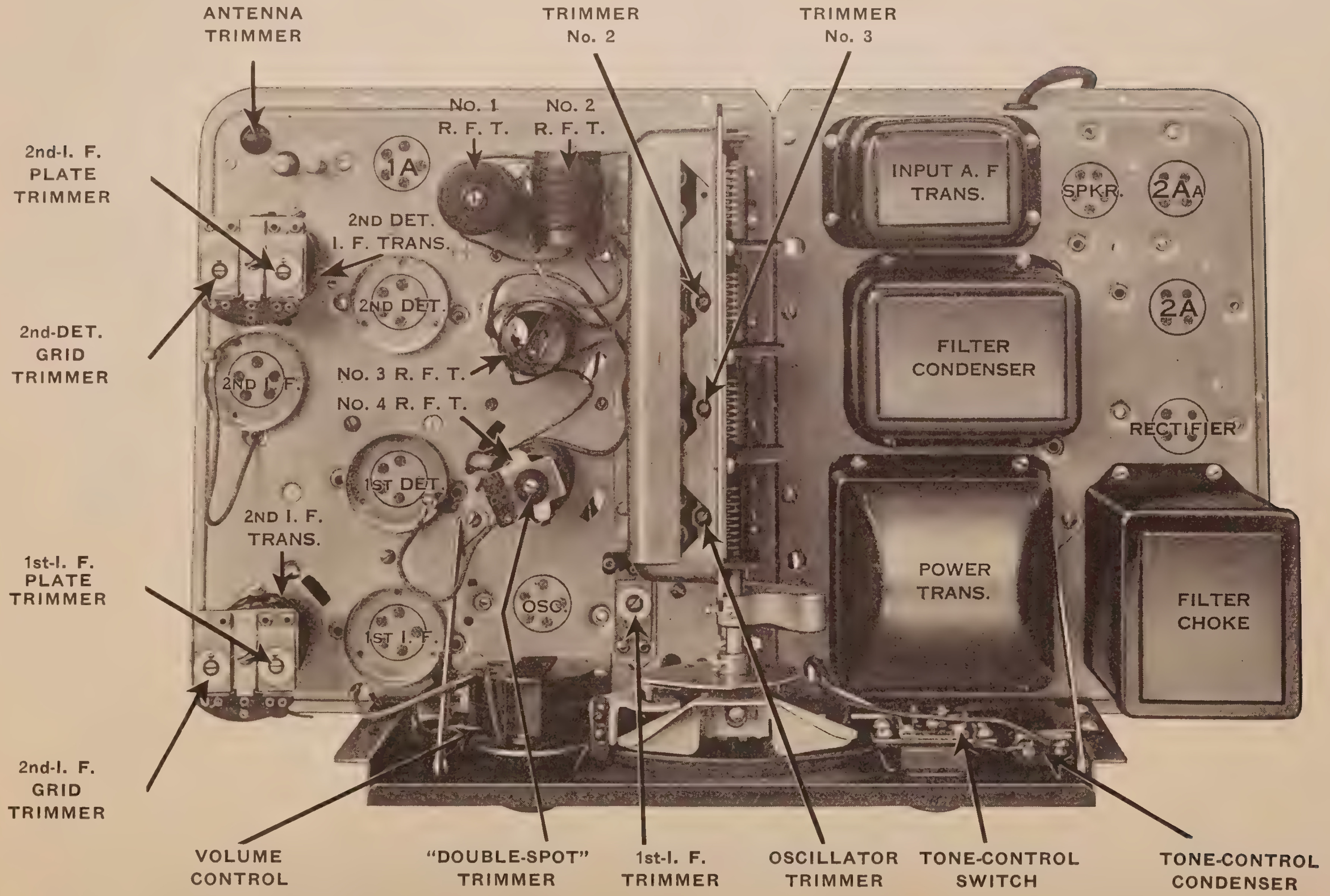

ANTENNA TRIMMER
TRIMMER No. 2
TRIMMER No. 3
2nd-I. F. PLATE TRIMMER
2nd-DET. GRID TRIMMER
1st-I. F. PLATE TRIMMER
2nd-I. F. GRID TRIMMER
No. 1 R. F. T.
No. 2 R. F. T.
1A
2ND DET. I. F. TRANS.
2ND DET.
2ND I. F.
No. 3 R. F. T.
No. 4 R. F. T.
1ST DET.
2ND I. F. TRANS.
OSC.
1ST I. F.
INPUT A. F TRANS.
SPKR.
2AA
2A
FILTER CONDENSER
RECTIFIER
POWER TRANS.
FILTER CHOKE
VOLUME CONTROL
"DOUBLE-SPOT" TRIMMER
1st-I. F. TRIMMER
OSCILLATOR TRIMMER
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER

Fig. 276. Top View of Atwater Kent Type H-2 Super-Heterodyne Chassis
Note that trimmer No. 1 is omitted. The antenna trimmer serves the same purpose

ADJUSTING TRIMMERS ON TYPE H-2 CHASSIS

Make Adjustments In Order Listed

Read Instructions on Pages 259 and 262

Preliminary

(a) Couple the 130 K. C. oscillator to the set. See Section 2, Page 262.

(b) Connect the common pick-up lead from the four-wave oscillator to one end of a No. 8112 condenser. Connect the other end of this condenser to the Antenna post. Connect the oscillator container to the Ground post.

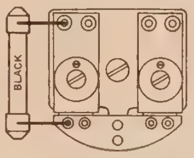
(c) Connect the output measuring circuit shown on Page 256 to the speaker-plug socket on the set. Close S2 and S3. Throw S1 to the left. Put S4 on the second tap.

(d) Put all tubes in the set. Break away the sealing wax on the trimmer-condenser screws.

(e) Put special coil shield on No. 4 R. F. T. so the double-spot trimmer is accessible. Also put special shields on the I. F. transformers.

(f) Make initial adjustment of rotors and dial pointer to 1500 K. C. as described on Page 262.

I. F. Trimmers



(120)

(g) Switch on the set and the 130 K. C. oscillator. Connect the black resistor across the 2nd-detector grid trimmer (see small illustration at left) and adjust the 2nd-I. F. plate trimmer for maximum output.

(h) Connect the resistor across the 2nd-I. F. plate trimmer and adjust the 2nd-detector grid trimmer for maximum output.

(i) Connect the resistor across the 2nd-I. F. grid trimmer and adjust the 1st-I. F. plate trimmer for maximum output.

(j) Connect the resistor across the 1st-I. F. plate trimmer and adjust the 2nd-I. F. grid trimmer for maximum output.

(k) Adjust the volume control to keep the output meter reading about 50 during these operations.
Turn off the 130 K. C. oscillator.

Oscillator Trimmers

Connect the black resistor across the 2nd-detector grid trimmer while adjusting the oscillator trimmers.

(l) Tune in the 1500 K. C. signal and adjust the oscillator trimmer to bring in this signal at exactly 150 on the dial.

(m) Adjust the antenna trimmer and trimmers Nos. 2 and 3 for maximum output from the 1500 K. C. signal.

(n) Turn dial pointer exactly to 80. Screw the oscillator-transformer adjusting disc in or out as necessary to the point that gives maximum output from the 800 K. C. signal.

(o) Turn dial pointer to 150. Re-set the oscillator trimmer to give maximum output from the 1500 K. C. signal.

(p) Turn dial pointer to 80. Re-set the disc for maximum output.

(q) Turn dial pointer **exactly** to 150. Adjust the oscillator trimmer for maximum output reading.

(r) Repeat operations (p) and (q) until further adjustment gives no change in dial reading. The object of this procedure is to bring in, without further adjustment, both the 1500 K. C. and the 800 K. C. signals at exactly the correct points on the dial: 150 and 80 respectively.

Double-Spot Trimmers

Remove the black resistor for this adjustment.

(s) Switch on the extra-strong 1500 K. C. signal and tune in its double-spot at 1240 K. C. Adjust the double-spot trimmer to give **minimum** output.

(t) Switch on the normal-strength 1500 K. C. signal and tune it in at 150. Adjust trimmer No. 3 to give maximum output.

(u) Repeat the instructions given in paragraphs (s) and (t) until further adjustment gives no change in output.

1st-I. F. Trimmer

Connect the black resistor across the 2nd-detector grid trimmer for this adjustment.

(v) With volume control full on, tune in the 1000 K. C. signal and adjust the 1st-I. F. trimmer for maximum audible output.
Re-seal the trimmer screws.

PARTS AND PRICE LIST—TYPE H-1, No. 16500, CHASSIS

BELOW SERIAL No. 5,855,201

(For Top View, see Page 268)

FRONT PANEL ASSEMBLY

Part No.		*Price*
19035	Front panel, complete	$ 2.50
19036	Front panel, with dial plate	1.50
17224	Front-panel brace (2 used)	.10
18551	Escutcheon	1.00
18339	Panel stud	.05
17244	Volume-control or tone-control knob	.30
17310	On-off switch	1.10
17270	Volume-control	5.50
18259	Volume-control bracket	.20
18223	Tone-control condenser clamp	.05
17959	Dial pointer	.05
17814	Dial knob	.30

16430	TONE-CONTROL SWITCH COMPLETE	.75
18148	Base	.60
18146	Shaft	.12
18112	Contact blade	.03

POWER UNITS

16660	Power transformer	$ 7.50
17825	Power-transformer spring	.10
17824	Power-transformer cover	.50
17563	Power-transformer insulating sheet	.02
15850	Filter condenser	7.95
18188	Filter-condenser case	.45
17534	Filter-condenser spacer	.25/c
17290	Filter choke	5.75
17302	Filter-choke lid	.20

17280	INPUT A. F. TRANSFORMER	3.75

19034	VARIABLE-CONDENSER STATOR, ROTOR AND FRAME (with leads and balance weight)	9.60
17107	Rotor connection (long)	.10
17291	Rotor connection (short)	.10
17062	Trimmer mica	.03
16420	Dial-light socket and reflector, less resistor and lead (one-hole mounting)	.40
16420A	Dial-light socket and reflector, less resistor and lead (two-hole mounting)	.40
18615	Dial gear	.40
17936	Dial-knob bracket (one-hole mounting)	.35
18144	Dial-knob bracket (two-hole mounting)	.35
17935	Dial-knob bracket support	.03
17941	Dial-knob shaft	.05
17961	Dial rubber and bushing	.15
17962	Pointer control arm	.30
15404	Dial light	.25
18236	Dial-light resistor	.15
18866	Stopping spring (on oscillator variable condenser)	.12

R. F. AND I. F. CHOKES

Part No.		*Price*
18220	2nd-I. F. stopping choke	$ .25
18220	2nd-I. F. plate choke (small)	.25
17390	2nd-I. F. plate choke (large)	.60
18220	2nd-detector stopping choke	.25
18220	2nd-I. F. cathode choke	.25
17390	1st-I. F. plate choke	.60
17390	2nd-detector plate choke	.60
17410	1st-detector plate choke	.35

R. F. AND I. F. TRANSFORMERS

19038	R. F. Coil Group	$ 4.00
8519	No. 1 R. F. T. cap	.25
18271	No. 2 R. F. T. bracket	.10
	The R. F. coil group includes R. F. T. No. 1, 2, 3 and 4, and the double-spot trimmer. If one R. F. transformer requires replacement, replace the entire group.	
17430	Oscillator transformer	1.00
19033	2nd-I. F. transformer	1.25
19033	2nd-detector I. F. transformer	1.25
18283	Mounting bracket	.05
17295	R. F. transformer shield	.50

SOCKETS

17518	1st-I. F. socket	$ .30
17518	1st-detector socket	.30
17519	2nd-detector socket	.30
17519	1st-A. F. socket	.30
17519	Oscillator socket	.30
18774	2nd-I. F. socket	.30
17509	2A socket	.25
17511	2Aa socket	.25
17377	Socket insulator (9 used)	.25/c
18007	Speaker-plug socket	.30
18016	Socket insulator	.25/c
18449	Fuse socket	.15
17508	Rectifier socket	.25

MISCELLANEOUS PARTS

17524	110-volt cable, with plug	$ 1.90
8956	Plug only	.30
16741	Bushing for 110-volt cable	.05
16742	Bushing-retaining spring	.05
17521	Antenna and grd. post and base	.45
17323	Base only	.05
8215	Binding post	.20
18286	Shield between I. F. trans.	.20
15214	Tube-shield base (4 used)	.03
15213	Tube-shield (4 used)	.15
13989	Ground clamp	.30
17223	Cross piece (10 in. by ⅞ in.)	.25
18117	Balance weight	.35
	Trimmer-condenser sealing wax	.50/lb.
17210	Literature assembly	.20 net
18652	Instruction book	.10 net
18118	Guide card (form F-680)	.75/c net
18119	Log card (form F-681)	.75/c net
18661	Shipping container	.65 net
17536	Bottom plate	1.30
18534	Fuse (2 ampere)	.05
18566	"Super Heterodyne" name plate	.06

January, 1931. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE H-1, No. 16500, CHASSIS
BELOW SERIAL No. 5,855,201

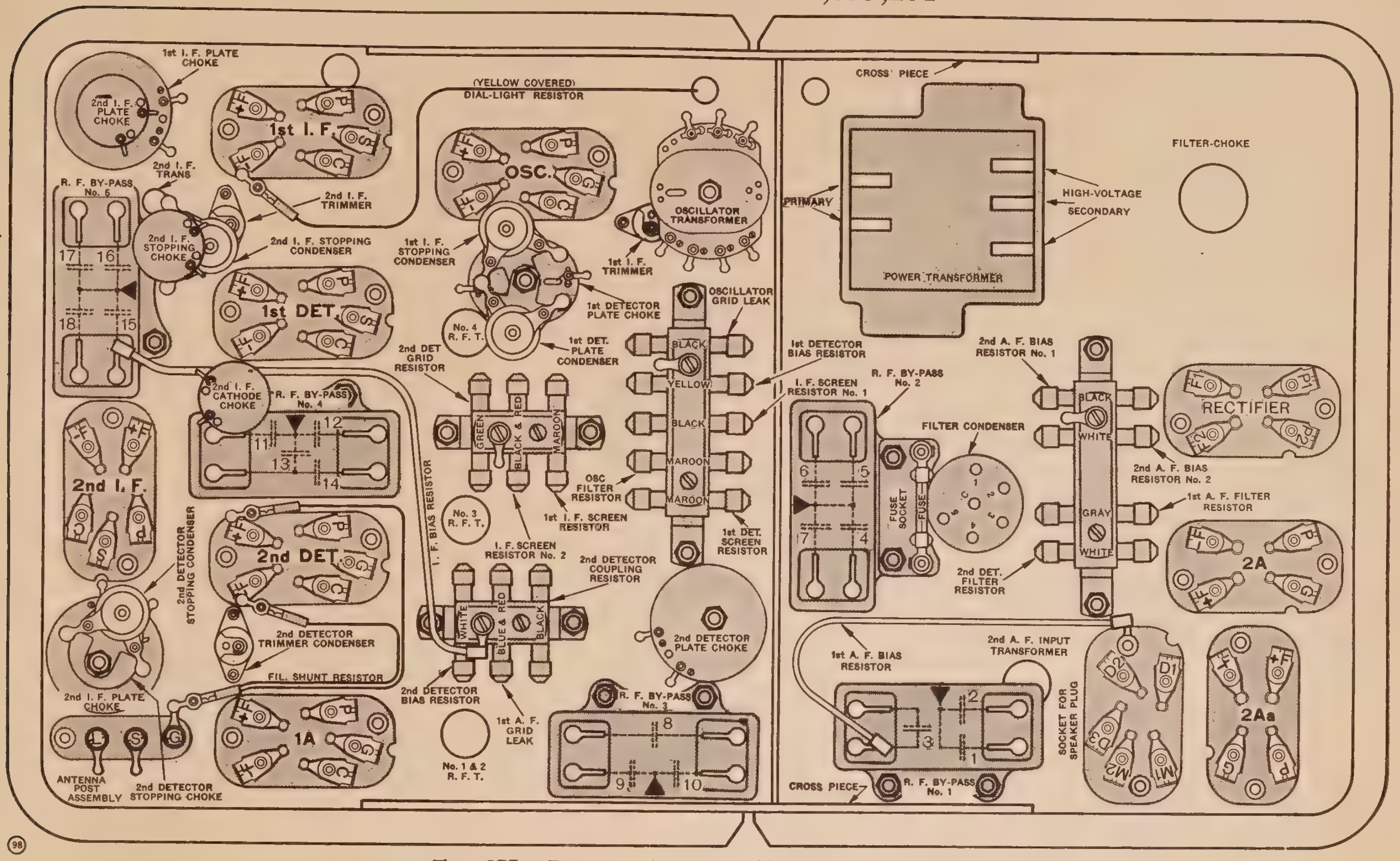

1st I. F. PLATE CHOKE
2nd I. F. PLATE CHOKE
2nd I. F. TRANS
1st I. F.
(YELLOW COVERED) DIAL-LIGHT RESISTOR
OSC.
R. F. BY-PASS No. 6
2nd I. F. TRIMMER
2nd I. F. STOPPING CHOKE
2nd I. F. STOPPING CONDENSER
1st I. F. STOPPING CONDENSER
OSCILLATOR TRANSFORMER
1st I. F. TRIMMER
17
16
18
15
1st DET.
1st DETECTOR PLATE CHOKE
OSCILLATOR GRID LEAK
No. 4 R. F. T.
1st DET. PLATE CONDENSER
2nd DET GRID RESISTOR
2nd I. F. CATHODE CHOKE
R. F. BY-PASS No. 4
12
11
13
14
BLACK
YELLOW
BLACK
MAROON
MAROON
GREEN
BLACK & RED
MAROON
2nd I. F.
OSC FILTER RESISTOR
1st I. F. SCREEN RESISTOR
No. 3 R. F. T.
I. F. BIAS RESISTOR
2nd DETECTOR STOPPING CONDENSER
2nd DET.
I. F. SCREEN RESISTOR No. 2
2nd DETECTOR COUPLING RESISTOR
1st DET. SCREEN RESISTOR
2nd DETECTOR TRIMMER CONDENSER
WHITE
BLUE & RED
BLACK
2nd DETECTOR PLATE CHOKE
FIL. SHUNT RESISTOR
2nd I. F. PLATE CHOKE
2nd DETECTOR BIAS RESISTOR
1st A. F. GRID LEAK
R. F. BY-PASS No. 3
8
9
10
1A
L
S
G
ANTENNA POST ASSEMBLY
2nd DETECTOR STOPPING CHOKE
No. 1 & 2 R. F. T.
CROSS PIECE
FILTER-CHOKE
PRIMARY
HIGH-VOLTAGE SECONDARY
POWER TRANSFORMER
1st DETECTOR BIAS RESISTOR
I. F. SCREEN RESISTOR No. 1
R. F. BY-PASS No. 2
2nd A. F. BIAS RESISTOR No. 1
FILTER CONDENSER
RECTIFIER
BLACK
WHITE
GRAY
WHITE
2nd A. F. BIAS RESISTOR No. 2
1st A. F. FILTER RESISTOR
6
5
7
4
FUSE SOCKET
FUSE
2nd DET. FILTER RESISTOR
2A
1st A. F. BIAS RESISTOR
2nd A. F. INPUT TRANSFORMER
2
3
1
SOCKET FOR SPEAKER PLUG
2Aa
D1
M2
M1
CROSS PIECE
R. F. BY-PASS No. 1
98

FIG. 277. BOTTOM CHART OF TYPE H-1 CHASSIS

TUBULAR RESISTORS
FIVE-RESISTOR GROUP

Part No.		Price
15592	I. F. screen-grid resistor No. 1 (black)	$ .25
15544	1st-det. bias resistor (yellow)	.25
15545	1st-det. screen resistor (maroon)	.25
15592	Oscillator grid leak (black)	.25
15545	Oscillator filter resistor (maroon)	.25
17118	Mounting bracket	.05
17117	Fibre resistor-pad	.25/c
17119	Metal clamping-strip	.02

FOUR-RESISTOR GROUP

Part No.		Price
15592	2nd-A. F. bias resistor No. 1 (black)	$ .25
16724	2nd-A. F. bias resistor No. 2 (white)	.25
15285	1st-A. F. filter resistor (gray)	.50
16724	2nd-det. filter resistor (white)	.25
17118	Mounting bracket	.05
17117	Fibre resistor-pad	.25/c
17119	Metal clamping-strip	.02

THREE-RESISTOR GROUPS

Part No.		Price
16282	1st-A. F. grid leak (blue and red)	$ .25
15592	2nd-detector coupling resistor (black)	.25
16724	2nd-detector bias resistor (white)	.25
15545	1st-I. F. screen resistor (maroon)	$ .25
15891	I. F. screen resistor No. 2 (black and red)	.25
15892	2nd-detector grid resistor (green)	.25
17341	Mounting bracket	.05
17342	Fibre resistor-pad	.25/c
17345	Metal clamping-strip	.02

FLEXIBLE RESISTORS

Part No.		Price
16320	1st-A. F. bias resistor	$ .20
17380	I. F. bias resistor	.20
17077	Filament-shunt resistor	.15
18236	Dial-light resistor	.15

FIXED CONDENSERS

Part No.		Price
17360	R. F. by-pass No. 1	$ 1.10
15262	R. F. by-pass No. 2 or No. 5	1.00
16745	R. F. by-pass No. 3	1.00
17370	R. F. by-pass No. 4	1.10
16490	Tone-control condenser	1.00
17440	1st-I. F. stopping cond. (thick)	.50
17470	1st-detector plate condenser (X scratched on fibre)	.35
17974	2nd-detector stopping condenser	.35
17974	2nd-I. F. stopping condenser	.35

TRIMMER CONDENSERS

Part No.		Price
17230	"Double-spot" trimmer	$ .35
17240	2nd-detector trimmer	.50
17240	1st-I. F. or 2nd-I. F. trimmer	.50

January, 1931. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE H-2, No. 16500, CHASSIS

ABOVE SERIAL No. 5,855,201

(For Top View, see Page 274)

FRONT PANEL ASSEMBLY

Part No.		*Price*
19035	Front panel, complete	$ 2.50
19036	Front panel, with dial plate	1.50
17224	Front-panel brace (2 used)	.10
18551	Escutcheon	1.00
18339	Panel stud	.05
17244	Volume-control or tone-control knob	.30
17310	On-off switch	1.10
17270	Volume control	5.50
18259	Volume-control bracket	.20
18223	Tone-control condenser clamp	.05
17959	Dial pointer	.05
17814	Dial knob	.30

16430	TONE-CONTROL SWITCH COMPLETE	.75
18148	Base	.60
18146	Shaft	.12
18112	Contact blade	.03

POWER UNITS

16660	Power transformer	$ 7.50
17825	Power-transformer spring	.10
17824	Power-transformer cover	.50
17563	Power-transformer insulating sheet	.02
15850	Filter condenser	7.95
18188	Filter-condenser case	.45
17534	Filter-condenser spacer (fibre)	.25/c
17290	Filter choke	5.75
17302	Filter-choke lid	.20

17280	INPUT A. F. TRANSFORMER	3.75

19324	VARIABLE-CONDENSER STATOR, ROTOR AND FRAME (with leads and balance weight)	9.60
17107	Rotor connection (long)	.10
17291	Rotor connection (short)	.10
17062	Trimmer mica	.03
16420A	Dial-light socket and reflector, less resistor and lead	.40
18615	Dial gear	.40
18144	Dial-knob bracket	.35
17935	Dial-knob bracket support	.03
17941	Dial-knob shaft	.05
17961	Dial-rubber and bushing	.15
17962	Pointer control arm	.30
15404	Dial light	.25
18236	Dial-light resistor	.15
18866	Stopping spring (on oscillator variable condenser)	.12

R. F. AND I. F. TRANSFORMERS

Part No.		*Price*
19497	R. F. Coil Group	$ 4.00
8519	No. 1 R. F. transformer cap	.25
18271	No. 2 R. F. T. bracket	.10
	The R. F. coil group includes R. F. T. No. 1, 2, 3 and 4, and the double-spot trimmer. If one R. F. transformer requires replacement, replace the entire group.	
17430	Oscillator trans.	1.00
19225	2nd-I. F. transformer	2.00
19226	2nd-detector I. F. transformer	2.00
17295	Transformer shield (1 used)	.50
18261	Transformer shield (3 used)	.50

TRIMMER CONDENSERS

19326	Antenna trimmer (less antenna and ground posts)	$ .60
17230	"Double-spot" trimmer	.35
17240	1st-I. F. trimmer	.50
18150	2nd-I. F. grid trimmer and 1st-I. F. plate trimmer	.95
18150	2nd-det. grid trimmer and 2nd-I. F. plate trimmer	.95

FIXED CONDENSERS

17360	R. F. by-pass No. 1	$ 1.10
15262	R. F. by-pass No. 2	1.00
16745	R. F. by-pass No. 3	1.00
17370	R. F. by-pass No. 4	1.10
15262	R. F. by-pass No. 5	1.00
16490	Tone-control condenser	1.00
17440	1st-I. F. stopping condenser	.50

MISCELLANEOUS PARTS

17524	110-volt cable, with plug	$ 1.90
8956	Plug only	.30
16741	Bushing for 110-volt cable	.05
16742	Bushing-retaining spring	.05
8215	Binding post (antenna or ground)	.20
15214	Tube-shield base (4 used)	.03
15213	Tube-shield (4 used)	.15
13989	Ground clamp	.30
17223	Cross piece (10 in. by 7/8 in.—2 used)	.25
18117	Balance weight	.35
	Trimmer-condenser sealing wax	.50/lb.
18180	Literature assembly	.20 net
19192	Instruction book	.10 net
18118	Guide card (form F-680)	.75/c net
18119	Log card (form F-681)	.75/c net
18661	Shipping container	.65 net
17536	Bottom plate	1.30
18534	Fuse (2 ampere)	.05
18566	"Super Heterodyne" name plate	.06

January, 1931. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE H-2, No. 16500, CHASSIS

ABOVE SERIAL No. 5,855,201

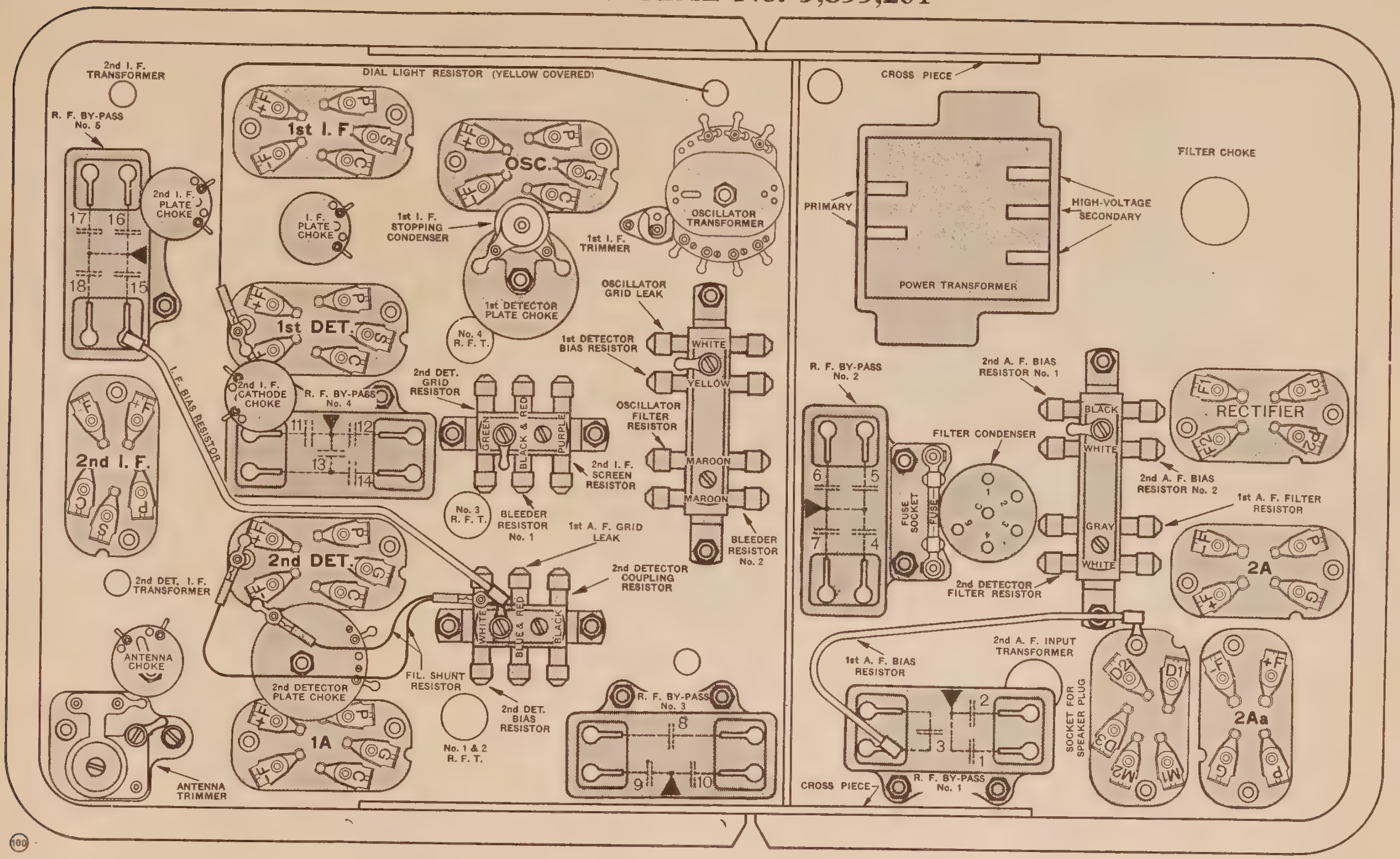

2nd I. F. TRANSFORMER
R. F. BY-PASS No. 5
17
16
18
15
2nd I. F. PLATE CHOKE
DIAL LIGHT RESISTOR (YELLOW COVERED)
1st I. F.
I. F. PLATE CHOKE
OSC.
1st I. F. STOPPING CONDENSER
1st I. F. TRIMMER
OSCILLATOR TRANSFORMER
1st DETECTOR PLATE CHOKE
OSCILLATOR GRID LEAK
1st DET.
No. 4 R. F. T.
1st DETECTOR BIAS RESISTOR
WHITE
YELLOW
I. F. BIAS RESISTOR
2nd I. F. CATHODE CHOKE
R. F. BY-PASS No. 4
11
12
13
14
2nd DET. GRID RESISTOR
GREEN
BLACK & RED
PURPLE
OSCILLATOR FILTER RESISTOR
MAROON
MAROON
2nd I. F. SCREEN RESISTOR
2nd I. F.
No. 3 R. F. T.
BLEEDER RESISTOR No. 1
1st A. F. GRID LEAK
BLEEDER RESISTOR No. 2
2nd DET.
2nd DET. I. F. TRANSFORMER
2nd DETECTOR COUPLING RESISTOR
WHITE
BLUE & RED
BLACK
ANTENNA CHOKE
2nd DETECTOR PLATE CHOKE
FIL. SHUNT RESISTOR
1A
2nd DET. BIAS RESISTOR
No. 1 & 2 R. F. T.
R. F. BY-PASS No. 3
8
9
10
ANTENNA TRIMMER
CROSS PIECE
PRIMARY
HIGH-VOLTAGE SECONDARY
POWER TRANSFORMER
FILTER CHOKE
R. F. BY-PASS No. 2
2nd A. F. BIAS RESISTOR No. 1
BLACK
WHITE
RECTIFIER
FILTER CONDENSER
6
5
7
4
FUSE SOCKET
FUSE
2nd A. F. BIAS RESISTOR No. 2
1st A. F. FILTER RESISTOR
GRAY
WHITE
2A
2nd DETECTOR FILTER RESISTOR
2nd A. F. INPUT TRANSFORMER
1st A. F. BIAS RESISTOR
2
3
1
SOCKET FOR SPEAKER PLUG
2Aa
CROSS PIECE
R. F. BY-PASS No. 1
100

FIG. 278. BOTTOM CHART OF TYPE H-2 CHASSIS
In this chart, the 2nd-I. F. screen resistor should be maroon instead of purple.

TUBULAR RESISTORS
FOUR-RESISTOR GROUPS

Part No.		Price
15592	2nd-A. F. bias resistor No. 1 (black)	$ .25
16724	2nd-A. F. bias resistor No. 2 (white)	.25
15285	1st-A. F. filter resistor (gray)	.50
16724	2nd-det. filter resistor (white)	.25
15545	Bleeder resistor No. 2 (maroon)	.25
15544	1st-det. bias resistor (yellow)	.25
16724	Oscillator grid leak (white)	.25
15545	Oscillator filter resistor (maroon)	.25
17118	Mounting bracket	.05
17117	Fibre resistor-pad	.25/c
17119	Metal clamping-strip	.02

THREE-RESISTOR GROUPS

Part No.		Price
16282	1st-A. F. grid leak (blue and red)	$ .25
15592	2nd-detector coupling resistor (black)	.25
16724	2nd-detector bias resistor (white)	.25
15545	2nd-I. F. screen resistor (maroon)	.25
15891	Bleeder resistor No. 1 (black and red)	.25
15892	2nd-detector grid resistor (green)	.25
17341	Mounting bracket	$ .05
17342	Fibre resistor-pad	.25/c
17345	Metal clamping-strip	.02

SOCKETS

Part No.		Price
17518	1st-I. F. socket	$ .30
17518	1st-detector socket	.30
17519	2nd-detector socket	.30
17519	1st-A. F. socket	.30
17519	Oscillator socket	.30
18774	2nd-I. F. socket	.30
17509	2A socket	.25
17511	2Aa socket	.25
17508	Rectifier socket	.25
17377	Socket insulator (9 used)	.25/c
18007	Speaker-plug socket	.30
18016	Socket insulator	.25/c
18449	Fuse socket	.15

FLEXIBLE RESISTORS

Part No.		Price
16320	1st-A. F. bias resistor	$ .20
17380	I. F. bias resistor	.20
17077	Filament-shunt resistor	.15
18236	Dial-light resistor	.15

R. F. AND I. F. CHOKES

Part No.		Price
18220	Antenna choke	$ .25
18220	2nd-I. F. plate choke	.25
18220	2nd-I. F. cathode choke	.25
17390	2nd-detector plate choke	.60
18160	1st-detector plate choke	1.00
18220	I. F. plate choke	.25

January, 1931. These prices supersede all previous prices and are subject to change without notice.

PARTS AND PRICE LIST—TYPE N, 16400, CHASSIS SPEAKERS

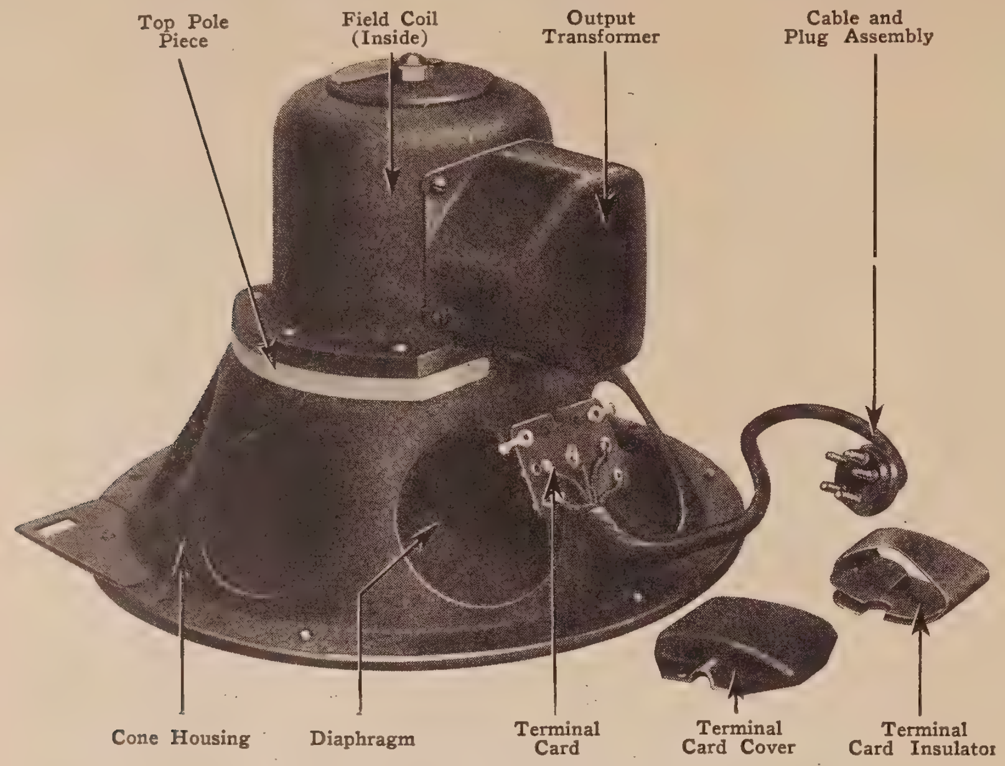
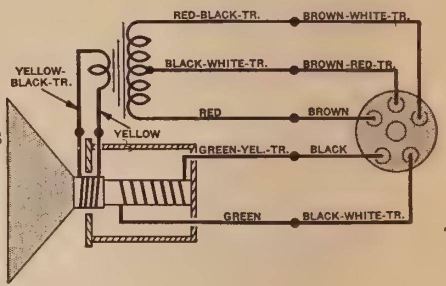

Top Pole Piece
Field Coil (Inside)
Output Transformer
Cable and Plug Assembly
Cone Housing
Diaphragm
Terminal Card
Terminal Card Cover
Terminal Card Insulator

FIG. 279. TYPE N SPEAKER

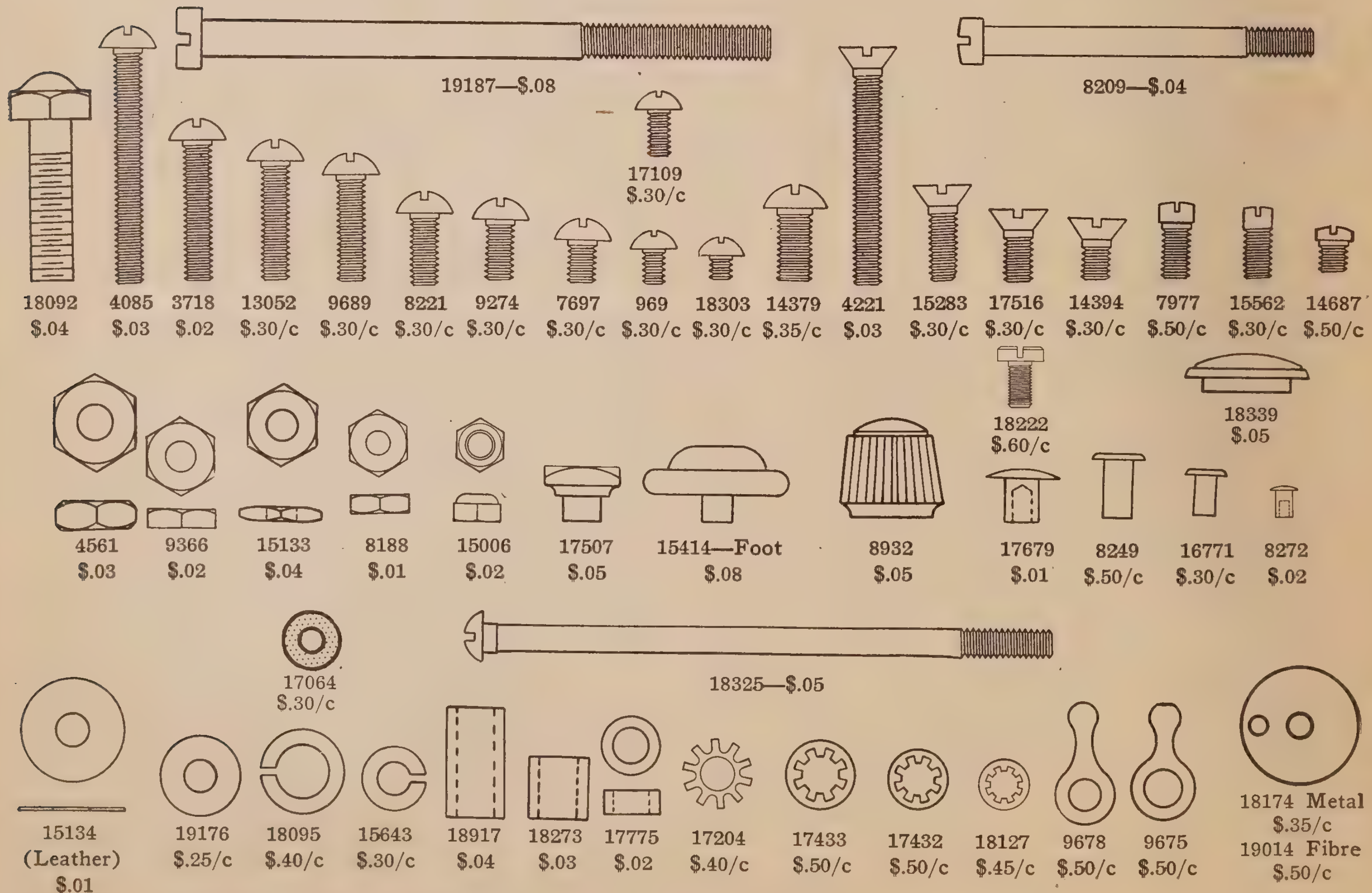
Part No.		*Price*
18081	Diaphragm	$3.25
16410	Field coil............	5.00
18093	Field-coil insulator...	.02
18075	Field-coil spacer.....	.09
18055	Top pole piece......	1.25
18073	Cone-housing and card	2.60
17889	Terminal card.......	.12
17796	Terminal insulator..	.02
17803	Terminal-card cover.	.12
17895	Cable and plug......	1.65
18582	Plug only..........	.65
14382	Steel ring..........	1.00
16390-A	Output transformer	3.25
	5-conductor cable....	.14/ft.
18068	Instruction sheet.....	.02 net
15578-N	Shipping container.	.35 net

FIG. 280. CONNECTIONS OF N SPEAKER


RED-BLACK-TR.
BROWN-WHITE-TR.
YELLOW-BLACK-TR.
BLACK-WHITE-TR.
BROWN-RED-TR.
RED
BROWN
YELLOW
GREEN-YEL.-TR.
BLACK
GREEN
BLACK-WHITE-TR.

SMALL PARTS ON H-1 AND H-2 CHASSIS AND N SPEAKER

Illustrations are Full Size


19187—$.08
8209—$.04
17109 $.30/c
18092 $.04
4085 $.03
3718 $.02
13052 $.30/c
9689 $.30/c
8221 $.30/c
9274 $.30/c
7697 $.30/c
969 $.30/c
18303 $.30/c
14379 $.35/c
4221 $.03
15283 $.30/c
17516 $.30/c
14394 $.30/c
7977 $.50/c
15562 $.30/c
14687 $.50/c
18222 $.60/c
18339 $.05
4561 $.03
9366 $.02
15133 $.04
8188 $.01
15006 $.02
17507 $.05
15414—Foot $.08
8932 $.05
17679 $.01
8249 $.50/c
16771 $.30/c
8272 $.02
17064 $.30/c
18325—$.05
15134 (Leather) $.01
19176 $.25/c
18095 $.40/c
15643 $.30/c
18917 $.04
18273 $.03
17775 $.02
17204 $.40/c
17433 $.50/c
17432 $.50/c
18127 $.45/c
9678 $.50/c
9675 $.50/c
18174 Metal $.35/c
19014 Fibre $.50/c

January, 1931. These prices supersede all previous prices and are subject to change without notice.

ATWATER KENT RADIO

SERVICE DATA

With

PARTS AND PRICE LISTS FOR

MODEL 80, 80-F, 81, 82, 82-F, 82-D, 82-Q, 83, 83-F, 84, 84-F, 84-D, 84-Q 85, 85-F, 85-Q, 86, 86-F, 87, 89, 89-F, 89-P

TABULATED DATA FOR MODELS DESCRIBED IN THIS SUPPLEMENT

Model Number	Power Supply	Part Number Complete	Part Number Chassis	Part Number Speaker	Cabinet	Automatic Vol. Control	Tone Cont.	Local-Dist. Switch	TUBES									
									R.F.	1st Det.	1st I. F.	2nd I. F.	2nd Det.	1st A. F.	2nd A.F.	Osc.	Control Tube	Rect.
80	110-V., 60-C.	20900	20820	17300	*	No	Yes	No	—	35	35	—	24	47	—	27	—	80
80-F	110-V., 25-C.	21400	21710	17300	*	No	Yes	No	—	35	35	—	24	47	—	27	—	80
82	110-V., 60-C.	21000	21090	17300	**	Yes	Yes	No	—	35	35	—	24	47	—	27	24	80
82-F	110-V., 25-C.	21700	21740	17300	**	Yes	Yes	No	—	35	35	—	24	47	—	27	24	80
82-D	110-V., D. C.	21800	21750	18600	**	No	Yes	No	—	36	36	—	36	37	33	37	—	—
82-Q	Battery	21900	21760	18400	**	Yes	Yes	Yes	32	32	32	—	32	30	33	30	—	—
83	110-V., 60-C.	21100	——	18100 24600 †	Lowboy	No	Yes	No	—	35	35	—	24	47	—	27	—	80
83-F	110-V., 25-C.	22000	——	18100 24600 †	Lowboy	No	Yes	No	—	35	35	—	24	47	—	27	—	80
84 (Early)	110-V., 60-C.	17500	18930	17300	***	No	No	No	—	24	24	—	24	47	—	27	—	80
84 (Late)	110-V., 60-C.	19000	20060	17300	***	No	Yes	No	—	35	35	—	24	47	—	27	—	80
84-F (Early)	110-V., 25-C.	17600	19270	17300	***	No	No	No	—	24	24	—	24	47	—	27	—	80
84-F (Late)	110-V., 25-C.	19200	20070	17300	***	No	Yes	No	—	35	35	—	24	47	—	27	—	80
84-D (Early)	110-V., D. C.	17800	19680	18600	***	No	No	No	—	36	36	—	36	37	33	37	—	—
84-D (Late)	110-V., D. C.	19300	20080	18600	***	No	Yes	No	—	36	36	—	36	37	33	37	—	—
84-Q (Early)	Battery	18300	19550	18400	***	No	No	No	32	32	32	—	32	30	33	30	—	—
84-Q (Late)	Battery	19400	20090	18400	***	No	Yes	No	32	32	32	—	32	30	33	30	—	—
85 (Early)	110-V., 60-C.	17900	——	18100	Lowboy	No	Yes	No	—	24	24	—	24	47	—	27	—	80
85 (Late)	110-V., 60-C.	17900	——	18100 24600 †	Lowboy	Yes	Yes	No	—	35	35	—	24	47	—	27	24	80
85-F	110-V., 25-C.	18200	——	18100 24600 †	Lowboy	Yes	Yes	No	—	35	35	—	24	47	—	27	24	80
85-Q	Battery	22200	——	19900	Lowboy	Yes	Yes	Yes	—	32	32	32	32	30	33	30	—	—
86	110-V., 60-C.	23000	——	24600	Low-Highboy	Yes	Yes	No	35	35	35	—	24	47	—	27	24	80
86-F	110-V., 25-C.	24700	——	24600	Low-Highboy	Yes	Yes	No	35	35	35	—	24	47	—	27	24	80
87	110-V., 60-C.	21200	——	19800	Lowboy or Highboy	No	Yes	No	35	35	35	—	27	27	47 (2)	27	—	80
89	110-V., 60-C.	21300	——	19800	Lowboy or Highboy	Yes	Yes	No	35	35	35	—	27	27	47 (2)	27	24	80
89-F	110-V., 25-C.	22400	——	19800	Lowboy or Highboy	Yes	Yes	No	35	35	35	—	27	27	47 (2)	27	24	80
89-P	110-V., 60-C.	20000	——	19800	Phono. Comb.	Yes	Yes	No	35	35	35	—	27	27	47 (2)	27	24	80
81	Battery	20300	22750	22600	Model 81 has seven tubes: Three '36s as 1st, 2nd and 3rd R. F., one '37 as detector, two '38s as push-pull A. F., and one '37 as automatic volume control tube.													

*Compact type. Rounded arch of zebra wood. Matched butt walnut panel. Rope carved pilasters. 19¼" high, 15⅞" wide, 9⅞" deep.
**Compact type. Gothic arch of zebra wood. Matched butt walnut panel. Carved twist pilasters. 19¼" high, 15⅞" wide, 9⅞" deep.
***Compact type. Gothic arch. 19¼" high, 15⅞" wide, 9⅞" deep.
†The two part numbers for speakers in 83, 83-F, 85, 85-F indicate early- and late-type speakers.

LOWBOY. Finished in American walnut with matched butt walnut front panels. 23¾" wide, 15¼" deep, 38¾" high.
HIGHBOY with sliding doors. Finished in hand-rubbed American walnut. Matched butt walnut front panels and doors. 26" wide, 16¼" deep, 45¾" high.
LOW-HIGHBOY. Finished in American walnut with matched butt walnut front panels and apron, and rubbed top.
PHONOGRAPH COMBINATION CABINET. Finished in American walnut with rubbed top. Matched butt walnut front panels and apron. Top piano-hinged and with automatic support.

MODEL 80, 80-F, 83, 83-F

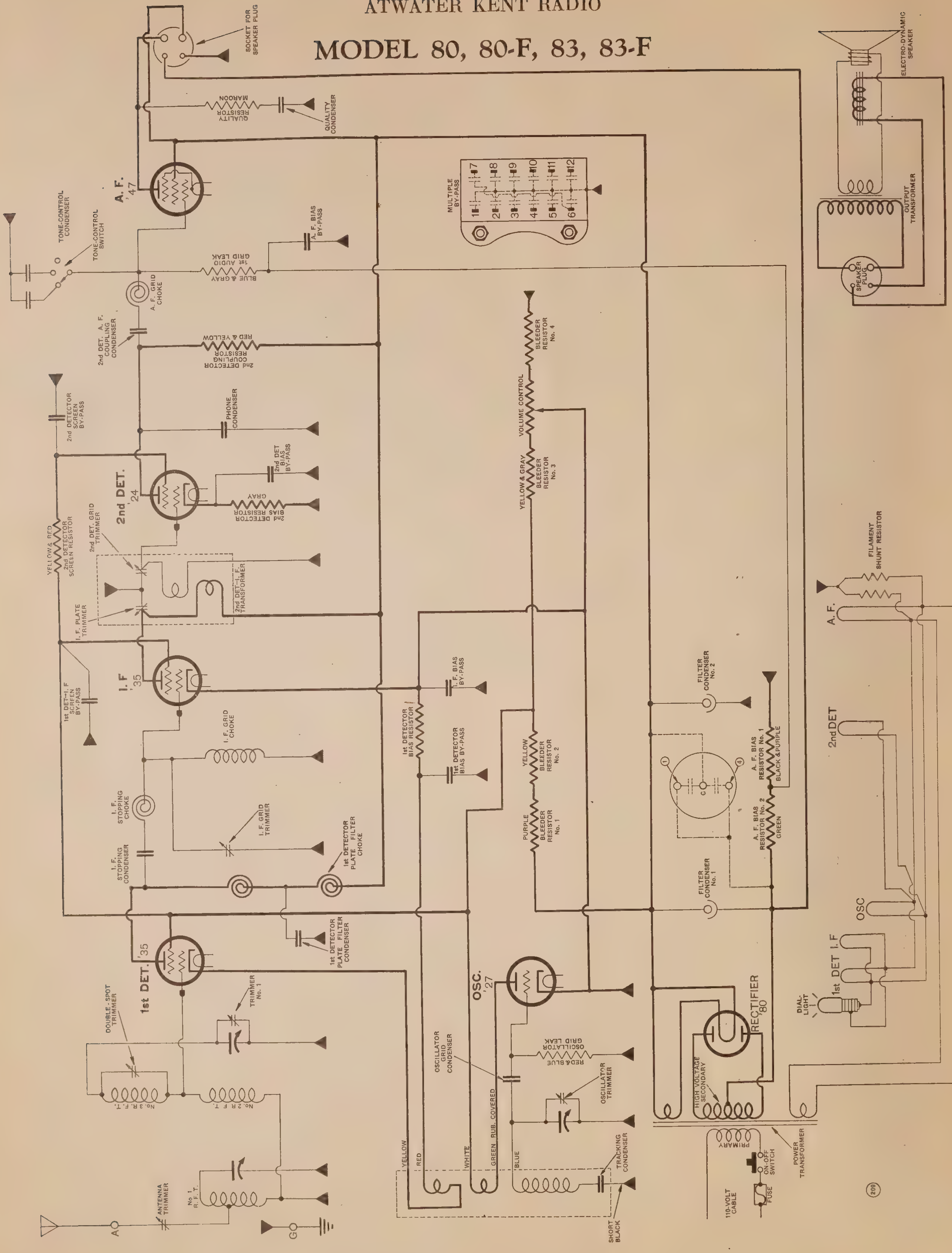

SOCKET FOR SPEAKER PLUG
QUALITY RESISTOR MAROON
QUALITY CONDENSER
A. F. '47
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
1st AUDIO GRID LEAK BLUE & GRAY
A. F. BIAS BY-PASS
A. F. GRID CHOKE
2nd DET. A. F. COUPLING CONDENSER
2nd DETECTOR COUPLING RESISTOR RED & YELLOW
2nd DETECTOR SCREEN BY-PASS
PHONE CONDENSER
2nd DET. '24
2nd DET BIAS BY-PASS
2nd DETECTOR BIAS RESISTOR GRAY
YELLOW & RED 2nd DETECTOR SCREEN RESISTOR
2nd DET. GRID TRIMMER
2nd DET—I. F. TRANSFORMER
I. F. PLATE TRIMMER
1st DET—I. F SCREEN BY-PASS
I. F. '35
I. F. BIAS BY-PASS
I. F. GRID CHOKE
I. F. STOPPING CHOKE
I. F. GRID TRIMMER
I. F. STOPPING CONDENSER
1st DETECTOR PLATE FILTER CHOKE
1st DETECTOR BIAS RESISTOR
1st DETECTOR BIAS BY-PASS
1st DETECTOR PLATE FILTER CONDENSER
1st DET. '35
DOUBLE-SPOT TRIMMER
TRIMMER No. 1
No. 3 R. F. T.
No. 2 R. F. T.
No. 1 R. F. T.
ANTENNA TRIMMER
A
G
MULTIPLE BY-PASS
1 2 3 4 5 6 7 8 9 10 11 12
BLEEDER RESISTOR No. 4
VOLUME CONTROL
YELLOW & GRAY BLEEDER RESISTOR No. 3
YELLOW BLEEDER RESISTOR No. 2
PURPLE BLEEDER RESISTOR No. 1
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR TRIMMER
TRACKING CONDENSER
SHORT BLACK
YELLOW
RED
WHITE
GREEN RUB. COVERED
BLUE
FILTER CONDENSER No. 2
FILTER CONDENSER No. 1
A. F. BIAS RESISTOR No. 1 BLACK & PURPLE
A. F. BIAS RESISTOR No. 2 GREEN
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
FILAMENT SHUNT RESISTOR
A. F.
2nd DET
OSC
1st DET I. F
DIAL LIGHT
209

FIG. 281. DIAGRAM OF MODEL 80, 80-F, 83, AND 83-F (A. C.-OPERATED).

In Model 83 and 83-F, a filter-condenser unit is used and it is connected as shown in dotted lines. This unit is NOT used in Model 80 and 80-F. In Model 83, 83-F, the electrolytic filter condenser No. 1 is not used, and the filament circuit is slightly different.

MODEL 81 MOTOR CAR RADIO

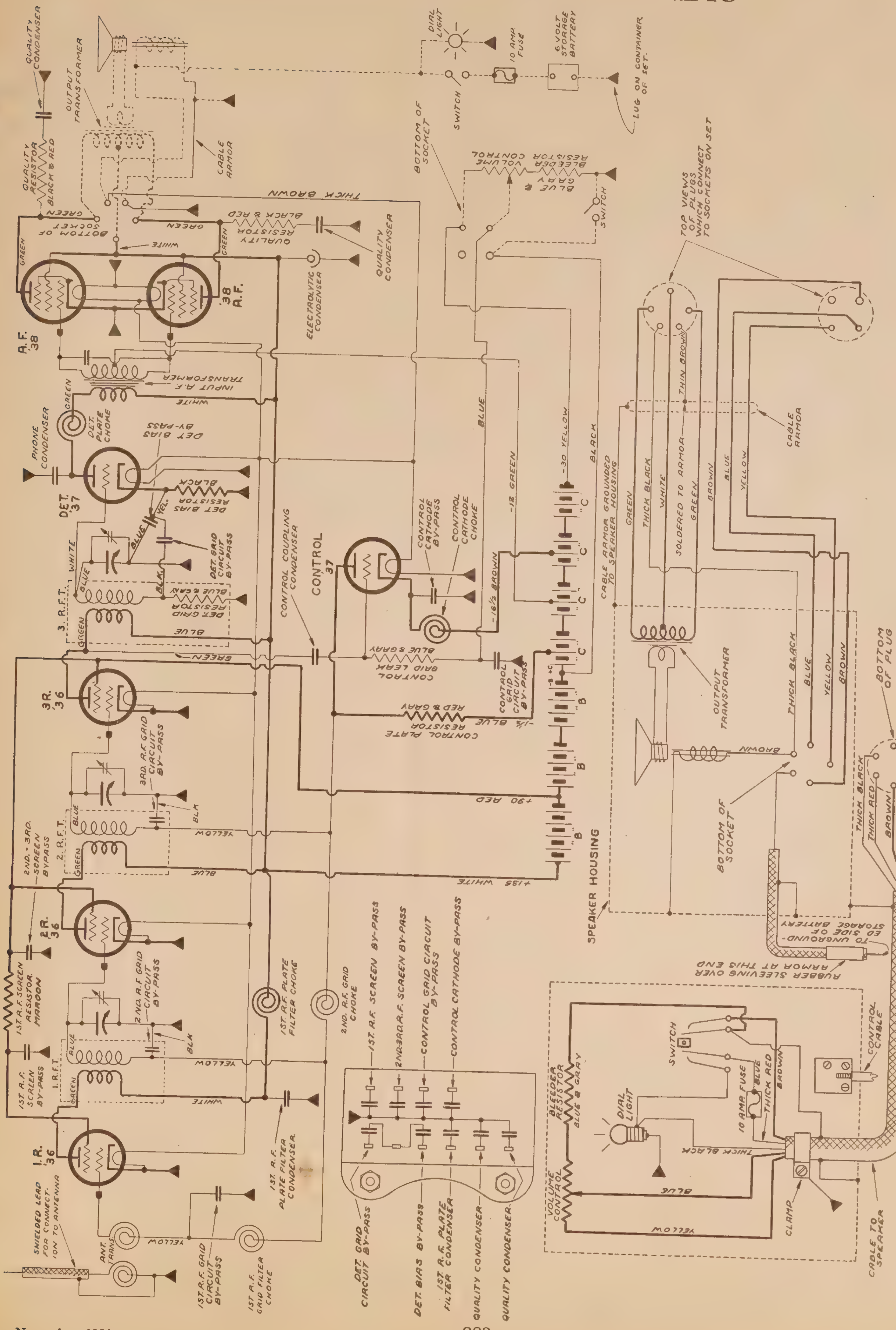

QUALITY CONDENSER
OUTPUT TRANSFORMER
QUALITY RESISTOR BLACK & RED
DIAL LIGHT
SWITCH
10 AMP. FUSE
6 VOLT STORAGE BATTERY
LUG ON CONTAINER OF SET.
CABLE ARMOR
BOTTOM OF SOCKET
VOLUME CONTROL
BLEEDER RESISTOR BLUE & GRAY
THICK BROWN
GREEN
BLACK & RED
QUALITY RESISTOR
QUALITY CONDENSER
WHITE
ELECTROLYTIC CONDENSER
TOP VIEWS OF PLUGS WHICH CONNECT TO SOCKETS ON SET
A.F. '38
38 A.F.
INPUT A.F. TRANSFORMER
PHONE CONDENSER
DET. PLATE CHOKE
DET BIAS BY-PASS
DET. '37
DET BIAS RESISTOR
BLACK
YEL.
BLUE
DET. GRID CIRCUIT BY-PASS
WHITE
BLK.
3. R.F.T.
DET GRID RESISTOR BLUE & GRAY
CONTROL COUPLING CONDENSER
CONTROL 37
CONTROL CATHODE BY-PASS
CONTROL CATHODE CHOKE
-30 YELLOW
BLACK
-12 GREEN
BLUE
-16½ BROWN
"C"
CONTROL GRID LEAK BLUE & GRAY
CONTROL GRID CIRCUIT BY-PASS
-1½ BLUE
CONTROL PLATE RESISTOR RED & GRAY
"B"
+90 RED
+135 WHITE
3R. 36
3RD. R.F. GRID CIRCUIT BY-PASS
BLK
YELLOW
2. R.F.T.
2ND.-3RD. SCREEN BYPASS
2R. 36
1ST. R.F. SCREEN RESISTOR. MAROON
2ND. R.F. GRID CIRCUIT BY-PASS
1. R.F.T.
1ST. R.F. SCREEN BY-PASS
1ST. R.F. PLATE FILTER CHOKE
2ND. R.F. GRID CHOKE
1.R. 36
1ST. R.F. PLATE FILTER CONDENSER.
SHIELDED LEAD FOR CONNECTION TO ANTENNA
ANT. TRANS.
1ST. R.F. GRID CIRCUIT BY-PASS
1ST. R.F. GRID FILTER CHOKE
DET. GRID CIRCUIT BY-PASS
1ST. R.F. SCREEN BY-PASS
2ND.&3RD. R.F. SCREEN BY-PASS
CONTROL GRID CIRCUIT BY-PASS
CONTROL CATHODE BY-PASS
DET. BIAS BY-PASS
1ST. R.F. PLATE FILTER CONDENSER
QUALITY CONDENSER
QUALITY CONDENSER.
SPEAKER HOUSING
CABLE ARMOR GROUNDED TO SPEAKER HOUSING
GREEN
THICK BLACK
WHITE
SOLDERED TO ARMOR
THIN BROWN
BROWN
BLUE
YELLOW
OUTPUT TRANSFORMER
BOTTOM OF SOCKET
BOTTOM OF PLUG
THICK BLACK
THICK RED
BROWN
YELLOW
BLUE
TO UNGROUNDED SIDE OF STORAGE BATTERY
RUBBER SLEEVING OVER ARMOR AT THIS END
BLEEDER RESISTOR BLUE & GRAY
DIAL LIGHT
SWITCH
10 AMP. FUSE
THICK RED
CONTROL CABLE
VOLUME CONTROL
CLAMP
CABLE TO SPEAKER

FIG. 282. DIAGRAM OF MODEL 81 MOTOR CAR RADIO (BATTERY-OPERATED).

This receiver consists of three units: (1st) the chassis and battery container, (2nd) the electro-dynamic speaker, (3rd) the remote-control unit.

MODEL 82, 82-F, 85, 85-F

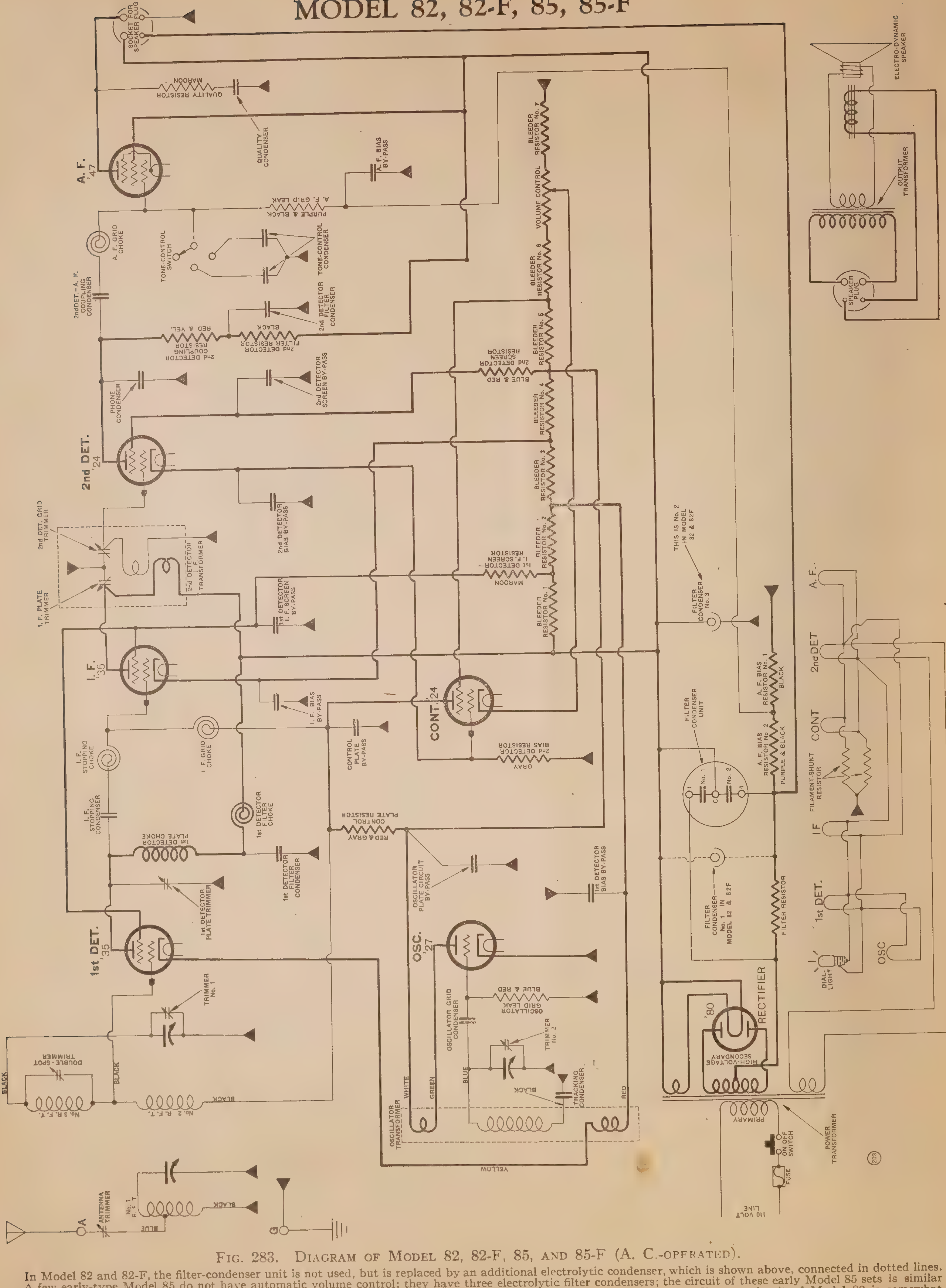

SOCKET FOR SPEAKER PLUG
QUALITY RESISTOR
MAROON
QUALITY CONDENSER
A. F. '47
A. F. BIAS BY-PASS
A. F. GRID LEAK
PURPLE & BLACK
A. F. GRID CHOKE
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
2nd DET.-A. F. COUPLING CONDENSER
2nd DETECTOR COUPLING RESISTOR
RED & YEL.
2nd DETECTOR FILTER RESISTOR
BLACK
2nd DETECTOR FILTER CONDENSER
PHONE CONDENSER
2nd DETECTOR SCREEN BY-PASS
2nd DET. '24
2nd DETECTOR BIAS BY-PASS
BLEEDER RESISTOR No. 7
VOLUME CONTROL
BLEEDER RESISTOR No. 6
BLEEDER RESISTOR No. 5
2nd DETECTOR SCREEN RESISTOR
BLUE & RED
BLEEDER RESISTOR No. 4
BLEEDER RESISTOR No. 3
BLEEDER RESISTOR No. 2
1st DETECTOR—I. F. SCREEN RESISTOR
MAROON
BLEEDER RESISTOR No. 1
2nd DET. GRID TRIMMER
2nd DETECTOR I. F. TRANSFORMER
I. F. PLATE TRIMMER
1st DETECTOR I. F. SCREEN BY-PASS
I. F. '35
I. F. BIAS BY-PASS
CONT. '24
CONTROL PLATE BY-PASS
2nd DETECTOR BIAS RESISTOR
GRAY
I. F. STOPPING CHOKE
I. F. GRID CHOKE
I. F. STOPPING CONDENSER
1st DETECTOR FILTER CHOKE
CONTROL PLATE RESISTOR
RED & GRAY
1st DETECTOR PLATE CHOKE
1st DETECTOR FILTER CONDENSER
1st DETECTOR PLATE TRIMMER
OSCILLATOR PLATE CIRCUIT BY-PASS
1st DETECTOR BIAS BY-PASS
1st DET. '35
OSC. '27
TRIMMER No. 1
OSCILLATOR GRID LEAK
BLUE & RED
OSCILLATOR GRID CONDENSER
TRIMMER No. 2
TRACKING CONDENSER
DOUBLE-SPOT TRIMMER
BLACK
BLACK
No. 3 R. F. T.
No. 2 R. F. T.
BLACK
BLUE
WHITE
GREEN
RED
OSCILLATOR TRANSFORMER
YELLOW
ANTENNA TRIMMER
A
No. 1 R. F. T.
BLUE
BLACK
G
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
THIS IS No. 2 IN MODEL 82 & 82F
FILTER CONDENSER No. 3
FILTER CONDENSER UNIT
No. 1
No. 2
A. F. BIAS RESISTOR No. 1
BLACK
A. F. BIAS RESISTOR No. 2
PURPLE & BLACK
FILTER CONDENSER No. 1 IN MODEL 82 & 82F
FILTER RESISTOR
A. F.
2nd DET
CONT
FILAMENT-SHUNT RESISTOR
IF
1st DET.
OSC
DIAL LIGHT
RECTIFIER
'80
HIGH-VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON OFF SWITCH
FUSE
110 VOLT LINE
203

FIG. 283. DIAGRAM OF MODEL 82, 82-F, 85, AND 85-F (A. C.-OPERATED).

In Model 82 and 82-F, the filter-condenser unit is not used, but is replaced by an additional electrolytic condenser, which is shown above, connected in dotted lines. A few early-type Model 85 do not have automatic volume control; they have three electrolytic filter condensers; the circuit of these early Model 85 sets is similar to Model 80. The tracking condenser is mounted on the oscillator transformer in Model 82 and some 85 sets. The filament circuit of Model 82 is somewhat different from that shown above.

MODEL 82-D, 84-D

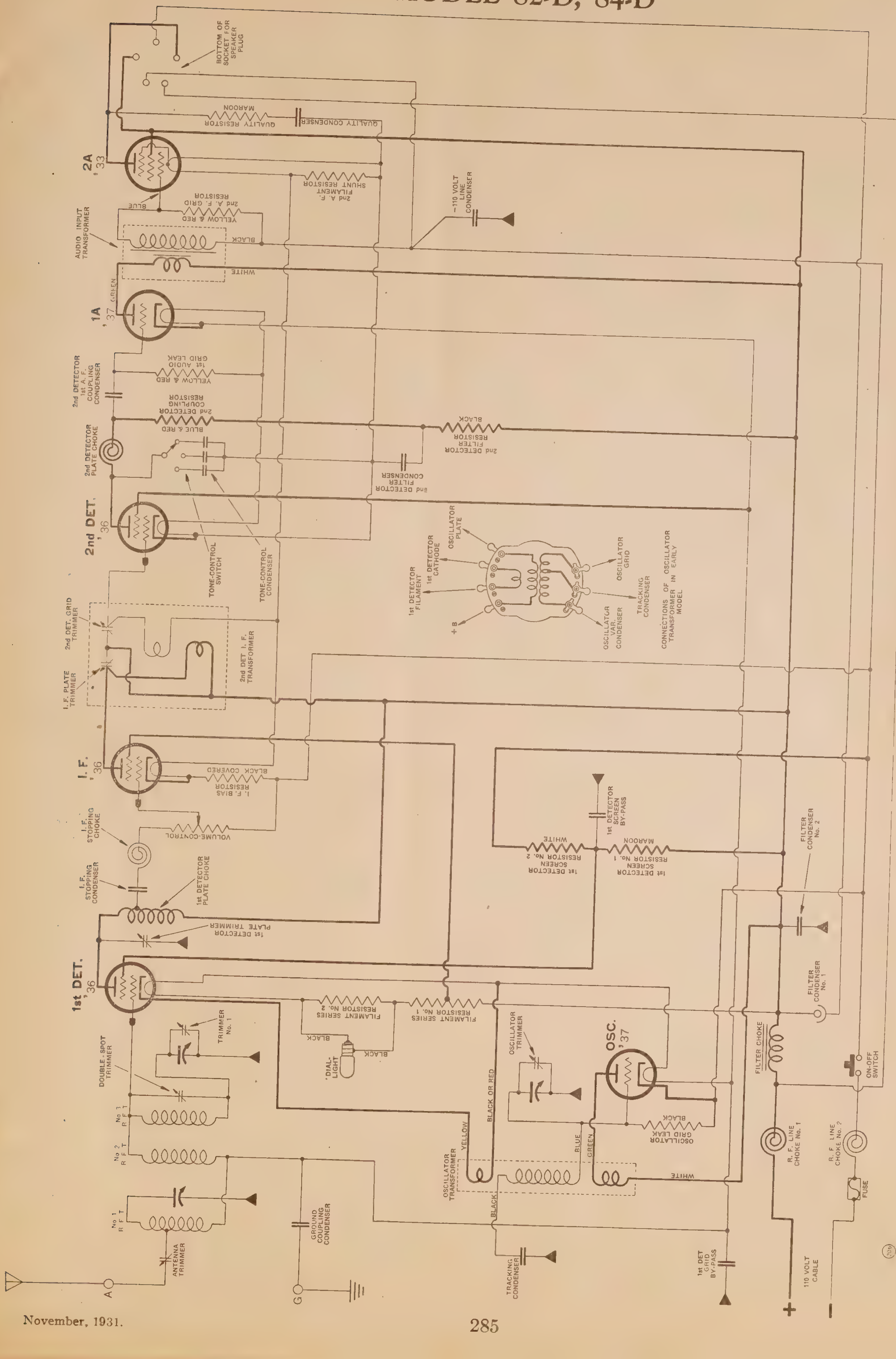

BOTTOM OF SOCKET FOR SPEAKER PLUG
MAROON
QUALITY RESISTOR
QUALITY CONDENSER
2A '33
2nd A. F. FILAMENT SHUNT RESISTOR
BLUE
2nd A. F. GRID RESISTOR
YELLOW & RED
—110 VOLT LINE CONDENSER
AUDIO INPUT TRANSFORMER
BLACK
WHITE
GREEN
1A '37
1st AUDIO GRID LEAK
YELLOW & RED
2nd DETECTOR 1st A. F. COUPLING CONDENSER
2nd DETECTOR COUPLING RESISTOR
BLUE & RED
BLACK
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR PLATE CHOKE
2nd DETECTOR FILTER CONDENSER
2nd DET. '36
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
OSCILLATOR PLATE
1st DETECTOR CATHODE
1st DETECTOR FILAMENT
OSCILLATOR GRID
TRACKING CONDENSER
+B
OSCILLATOR VAR. CONDENSER
CONNECTIONS OF OSCILLATOR TRANSFORMER IN EARLY MODEL
2nd DET. GRID TRIMMER
2nd DET I. F. TRANSFORMER
I. F. PLATE TRIMMER
I. F. '36
BLACK COVERED
I. F. BIAS RESISTOR
1st DETECTOR SCREEN BY-PASS
I. F. STOPPING CHOKE
VOLUME-CONTROL
WHITE
MAROON
1st DETECTOR SCREEN RESISTOR No. 2
1st DETECTOR SCREEN RESISTOR No. 1
FILTER CONDENSER No. 2
I. F. STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
1st DET. '36
FILAMENT SERIES RESISTOR No. 2
FILAMENT SERIES RESISTOR No. 1
FILTER CONDENSER No. 1
DOUBLE SPOT TRIMMER
TRIMMER No. 1
BLACK
BLACK
DIAL-LIGHT
OSCILLATOR TRIMMER
OSC. '37
FILTER CHOKE
ON-OFF SWITCH
No 1 R F T
No 2 R F T
No 1 R F T
BLACK OR RED
YELLOW
BLUE
GREEN
BLACK
OSCILLATOR GRID LEAK
R. F. LINE CHOKE No. 1
R. F. LINE CHOKE No. 2
OSCILLATOR TRANSFORMER
WHITE
BLACK
FUSE
ANTENNA TRIMMER
GROUND COUPLING CONDENSER
TRACKING CONDENSER
1st DET GRID BY-PASS
110 VOLT CABLE
A
G
+
—

FIG. 284. DIAGRAM OF MODEL 82-D AND 84-D (D. C.-OPERATED).

Early Model 84-D does not have tone control; it has a condenser, instead of a resistor, across the secondary of the audio input transformer; it has a small phone condenser connected to the plate of the 2nd-detector, and it has an antenna choke connected between the antenna and ground posts. In 82-D, the oscillator-tracking condenser is mounted on the oscillator transformer. Connections to the oscillator transformer in early-type 84-D are shown in the separate drawing. In 82-D, an extra-110-volt line condenser is connected from ground to a point between R. F. line choke No 2 and the on-off switch.

MODEL 82-Q

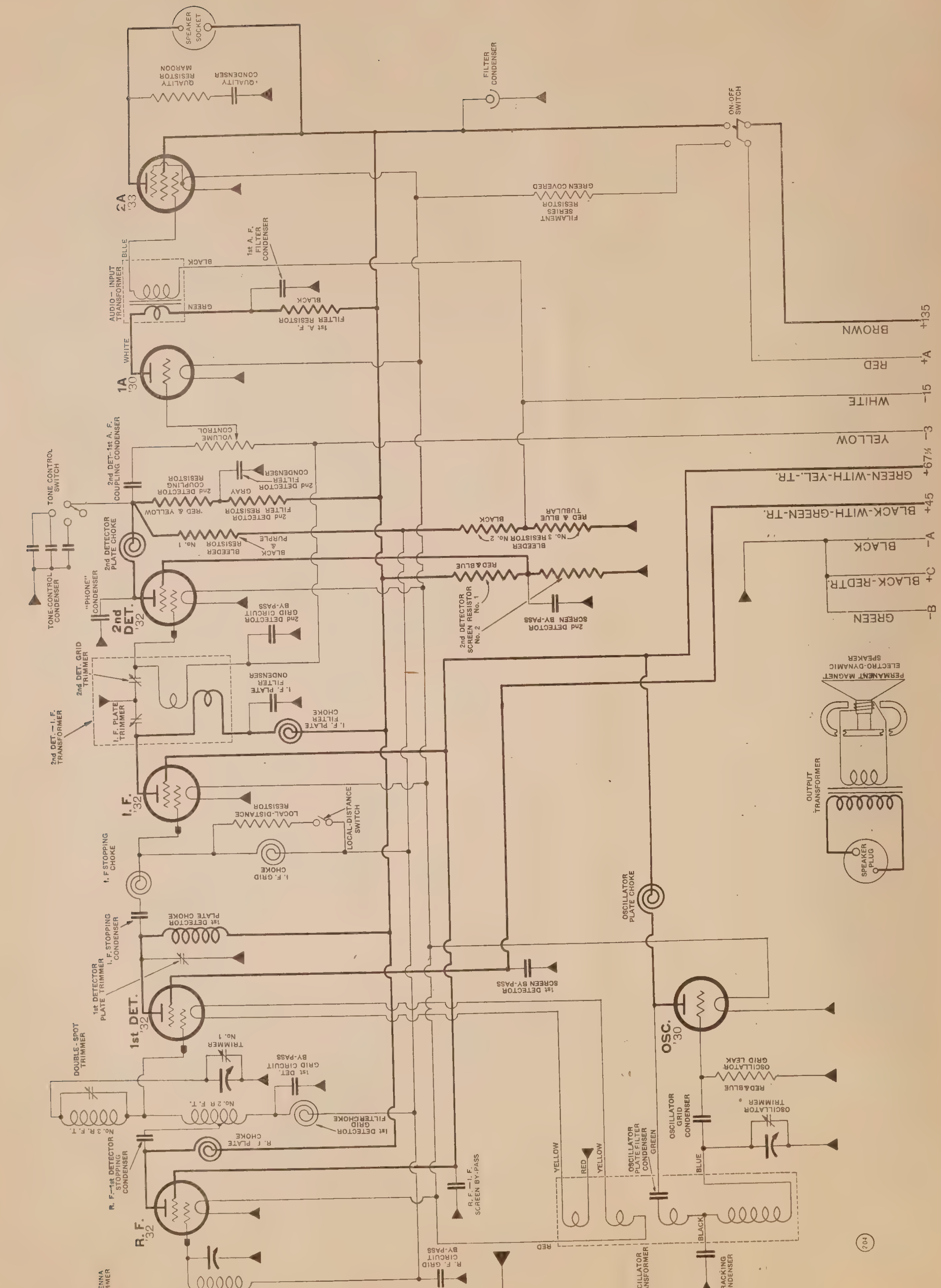

SPEAKER SOCKET
QUALITY RESISTOR MAROON
QUALITY CONDENSER
FILTER CONDENSER
ON-OFF SWITCH
2A '33
FILAMENT SERIES RESISTOR GREEN COVERED
1st A. F. FILTER CONDENSER
AUDIO-INPUT TRANSFORMER
BLUE
BLACK
GREEN
1st A. F. FILTER RESISTOR
WHITE
1A '30
BROWN +135
RED +A
WHITE −15
YELLOW −3
GREEN-WITH-YEL.-TR. +67½
BLACK-WITH-GREEN-TR. +45
BLACK −A
BLACK-RED-TR. +C
GREEN −B
VOLUME CONTROL
2nd DET.-1st A. F. COUPLING CONDENSER
TONE CONTROL SWITCH
TONE-CONTROL CONDENSER
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER CONDENSER
2nd DETECTOR FILTER RESISTOR
RED & YELLOW
GRAY
2nd DETECTOR PLATE CHOKE
BLEEDER RESISTOR No. 1
BLACK & PURPLE
BLEEDER No. 3 RESISTOR No. 2
RED & BLUE
TUBULAR
"PHONE" CONDENSER
2nd DET. '32
2nd DETECTOR GRID CIRCUIT BY-PASS
2nd DETECTOR SCREEN RESISTOR No. 1
2nd DETECTOR SCREEN RESISTOR No. 2
2nd DETECTOR SCREEN BY-PASS
2nd DET. GRID TRIMMER
2nd DET.—I. F. TRANSFORMER
I. F. PLATE TRIMMER
I. F. PLATE FILTER CONDENSER
I. F. PLATE FILTER CHOKE
PERMANENT MAGNET ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
I. F. '32
LOCAL-DISTANCE RESISTOR
LOCAL-DISTANCE SWITCH
I. F. GRID CHOKE
I. F. STOPPING CHOKE
I. F. STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
1st DETECTOR SCREEN BY-PASS
OSCILLATOR PLATE CHOKE
1st DET. '32
OSC. '30
DOUBLE-SPOT TRIMMER
TRIMMER No. 1
1st DET. GRID CIRCUIT BY-PASS
OSCILLATOR GRID LEAK
RED & BLUE
OSCILLATOR TRIMMER
OSCILLATOR GRID CONDENSER
No. 3 R. F. T.
No. 2 R. F. T.
1st DETECTOR GRID FILTER CHOKE
R. F. PLATE CHOKE
R. F.—1st DETECTOR STOPPING CONDENSER
R. F.—I. F. SCREEN BY-PASS
YELLOW
RED
YELLOW
OSCILLATOR PLATE FILTER CONDENSER
GREEN
BLUE
BLACK
RED
R. F. '32
R. F. GRID CIRCUIT BY-PASS
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
ANTENNA TRIMMER
No. 1 R. F. T.
G
204

FIG. 285. DIAGRAM OF MODEL 82-Q (BATTERY-OPERATED).

In some 82-Q receivers, the primary of the audio input transformer is connected as follows: Green to the plate, and white to the 1st-A. F. filter resistor.

MODEL 84-Q

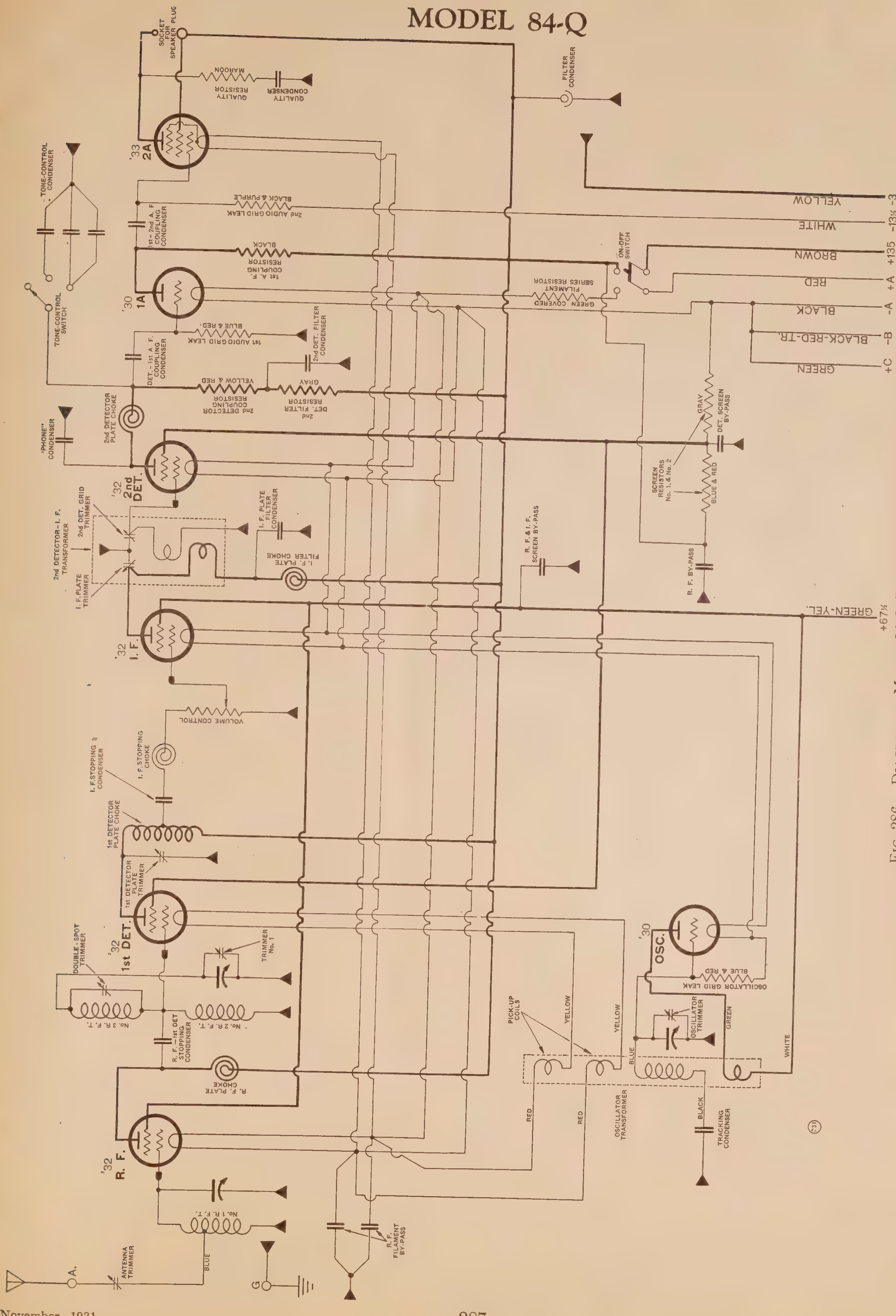

SOCKET FOR SPEAKER PLUG
QUALITY RESISTOR
MAROON
QUALITY CONDENSER
FILTER CONDENSER
'33 2A
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
2nd AUDIO GRID LEAK
BLACK & PURPLE
1st - 2nd A. F. COUPLING CONDENSER
1st A. F. COUPLING RESISTOR
BLACK
'30 1A
ON-OFF SWITCH
FILAMENT SERIES RESISTOR
GREEN COVERED
1st AUDIO GRID LEAK
BLUE & RED
DET. - 1st A. F. COUPLING CONDENSER
2nd DET. FILTER CONDENSER
2nd DETECTOR COUPLING RESISTOR
YELLOW & RED
2nd DET. FILTER RESISTOR
GRAY
"PHONE" CONDENSER
2nd DETECTOR PLATE CHOKE
'32 2nd DET.
2nd DET. GRID TRIMMER
2nd DETECTOR - I. F. TRANSFORMER
I. F. PLATE TRIMMER
I. F. PLATE FILTER CONDENSER
I. F. PLATE FILTER CHOKE
R. F. & I. F. SCREEN BY-PASS
SCREEN RESISTORS No. 1, & No. 2
DET. SCREEN BY-PASS
BLUE & RED
R. F. BY-PASS
YELLOW -3
WHITE -13½
BROWN +135
RED +A
BLACK -A
BLACK-RED-TR. -B
GREEN +C
GREEN-YEL. +67½
'32 I. F.
VOLUME CONTROL
I. F. STOPPING CONDENSER
I. F. STOPPING CHOKE
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
'32 1st DET.
DOUBLE - SPOT TRIMMER
TRIMMER No. 1
No. 3 R. F. T.
No. 2 R. F. T.
R. F. - 1st DET STOPPING CONDENSER
R. F. PLATE CHOKE
'30 OSC.
OSCILLATOR GRID LEAK
BLUE & RED
OSCILLATOR TRIMMER
PICK-UP COILS
YELLOW
YELLOW
BLUE
GREEN
WHITE
RED
RED
OSCILLATOR TRANSFORMER
BLACK
TRACKING CONDENSER
'32 R. F.
No. 1 R. F. T.
BLUE
ANTENNA TRIMMER
A.
G
R. F. FILAMENT BY-PASS
231

FIG. 286. DIAGRAM OF MODEL 84-Q (BATTERY-OPERATED).

A diagram of the speaker used with this set is shown in the diagram of Model 82-Q, Fig. 285.

Early-type 84-Q does not have tone control; it has a phone condenser in the 2nd-detector plate circuit; and it has an antenna choke connected across the antenna trimmer. The oscillator transformer in early-type Model 84-Q is different in this way: It has only one pick-up coil, which is connected in series with the screen of the 1st-detector. (The two filament-circuit pick-up coils are not used in the early model.)

MODEL 84, 84-F (Early Type)

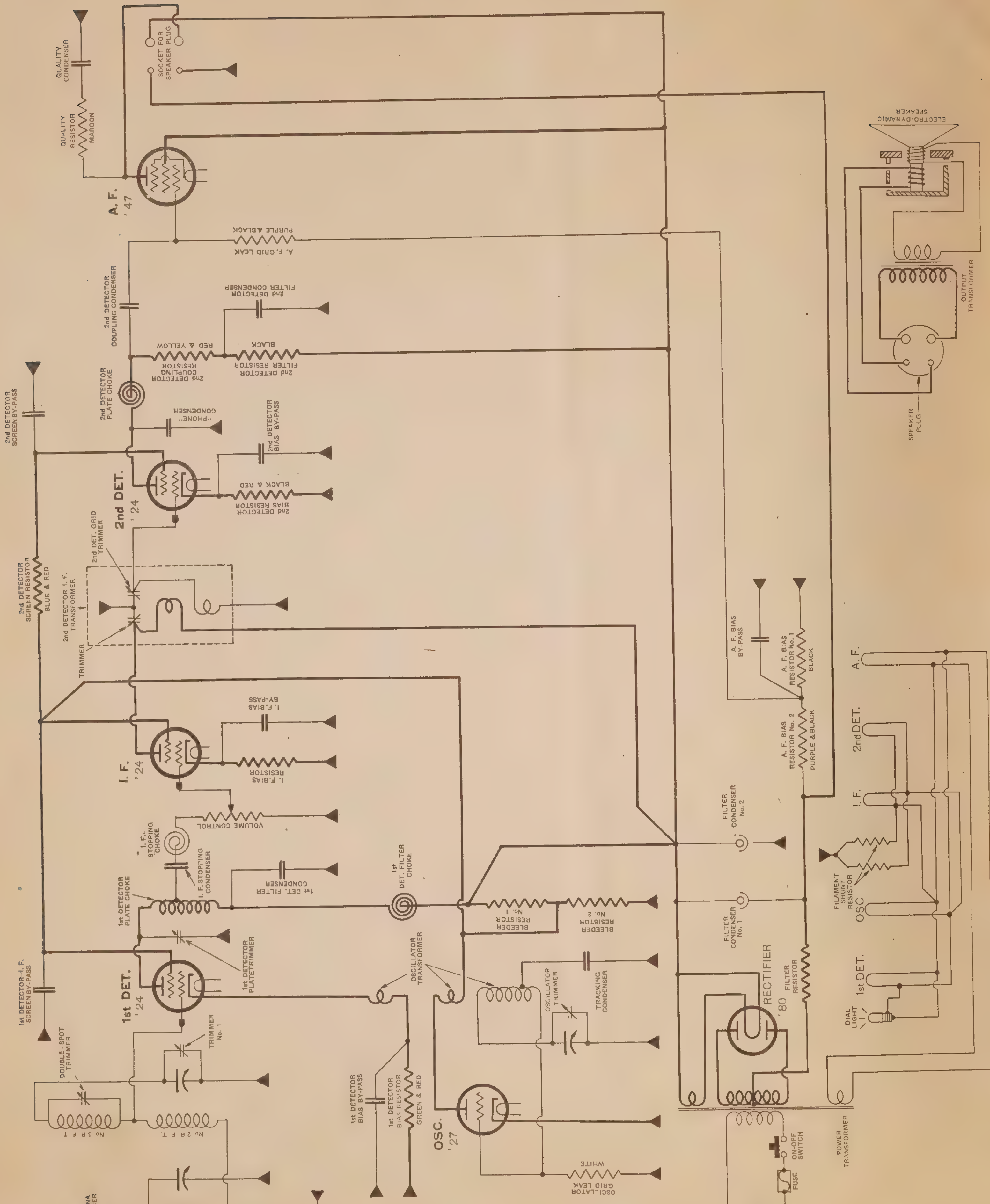

QUALITY CONDENSER
QUALITY RESISTOR MAROON
SOCKET FOR SPEAKER PLUG
A. F. '47
A. F. GRID LEAK PURPLE & BLACK
2nd DETECTOR COUPLING CONDENSER
2nd DETECTOR FILTER CONDENSER
RED & YELLOW
2nd DETECTOR COUPLING RESISTOR
BLACK
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR PLATE CHOKE
"PHONE" CONDENSER
2nd DETECTOR SCREEN BY-PASS
2nd DETECTOR BIAS BY-PASS
BLACK & RED
2nd DETECTOR BIAS RESISTOR
2nd DET. '24
2nd DET. GRID TRIMMER
2nd DETECTOR SCREEN RESISTOR BLUE & RED
2nd DETECTOR I. F. TRANSFORMER
TRIMMER
I. F. BIAS BY-PASS
I. F. '24
I. F. BIAS RESISTOR
VOLUME CONTROL
I. F. STOPPING CHOKE
I. F. STOPPING CONDENSER
1st DET. FILTER CONDENSER
1st DET. FILTER CHOKE
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 2
1st DETECTOR—I. F. SCREEN BY-PASS
1st DET. '24
OSCILLATOR TRANSFORMER
OSCILLATOR TRIMMER
TRACKING CONDENSER
TRIMMER No. 1
DOUBLE-SPOT TRIMMER
No. 3 R. F. T.
No. 2 R. F. T.
No. 1 R. F. T.
1st DETECTOR BIAS BY-PASS
1st DETECTOR BIAS RESISTOR GREEN & RED
OSC. '27
WHITE
OSCILLATOR GRID LEAK
A
ANTENNA TRIMMER
ANTENNA CHOKE
G
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
A. F. BIAS BY-PASS
A. F. BIAS RESISTOR No. 1 BLACK
A. F. BIAS RESISTOR No. 2 PURPLE & BLACK
FILTER CONDENSER No. 2
FILTER CONDENSER No. 1
RECTIFIER '80
FILTER RESISTOR
A. F.
2nd DET.
I. F.
OSC
1st DET.
FILAMENT SHUNT RESISTOR
DIAL LIGHT
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE

FIG. 287. DIAGRAM OF EARLY-TYPE MODEL 84 AND 84-F (A. C.-OPERATED).

In Model 84-F, the filter resistor (connected in series with the center-tap of the high-voltage winding) is NOT used.

MODEL 84, 84-F (Late Type)

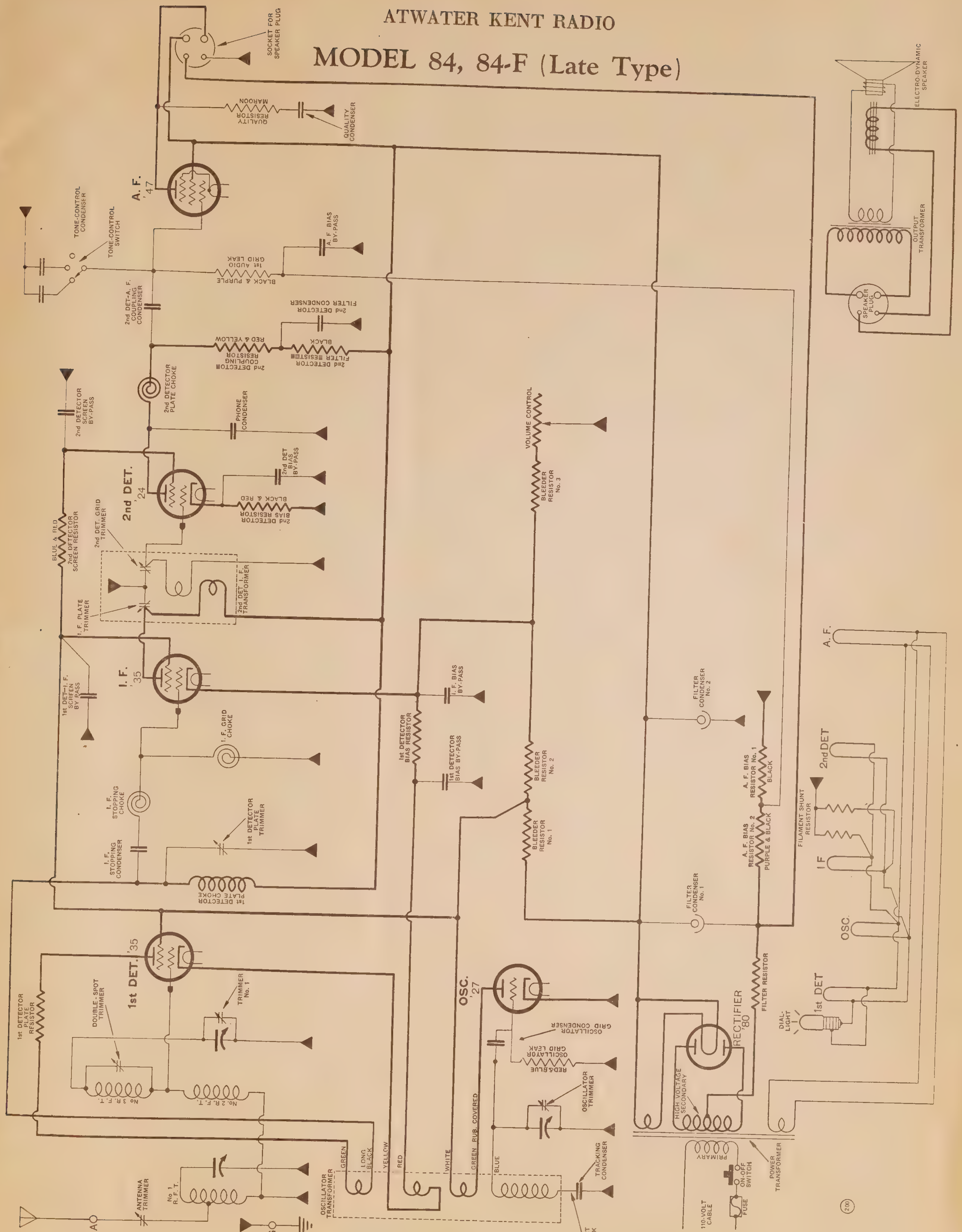

SOCKET FOR SPEAKER PLUG
QUALITY RESISTOR
MAROON
QUALITY CONDENSER
A. F. '47
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
A. F. BIAS BY-PASS
1st AUDIO GRID LEAK
BLACK & PURPLE
2nd DET-A. F. COUPLING CONDENSER
2nd DETECTOR FILTER CONDENSER
2nd DETECTOR COUPLING RESISTOR
RED & YELLOW
2nd DETECTOR FILTER RESISTOR
BLACK
2nd DETECTOR PLATE CHOKE
2nd DETECTOR SCREEN BY-PASS
PHONE CONDENSER
VOLUME CONTROL
2nd DET BIAS BY-PASS
2nd DET. '24
2nd DETECTOR BIAS RESISTOR
BLACK & RED
BLEEDER RESISTOR No. 3
BLUE & RED
2nd DETECTOR SCREEN RESISTOR
2nd DET. GRID TRIMMER
2nd DET. I. F. TRANSFORMER
I. F. PLATE TRIMMER
I. F. '35
1st DET—I. F. SCREEN BY PASS
I. F. BIAS BY-PASS
I. F. GRID CHOKE
1st DETECTOR BIAS RESISTOR
1st DETECTOR BIAS BY-PASS
BLEEDER RESISTOR No. 2
FILTER CONDENSER No. 2
I. F. STOPPING CHOKE
1st DETECTOR PLATE TRIMMER
I. F. STOPPING CONDENSER
BLEEDER RESISTOR No. 1
1st DETECTOR PLATE CHOKE
A. F. BIAS RESISTOR No. 1
BLACK
A. F. BIAS RESISTOR No. 2
PURPLE & BLACK
FILTER CONDENSER No. 1
FILAMENT SHUNT RESISTOR
A. F.
2nd DET
I F
OSC.
1st DET
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
1st DET. '35
1st DETECTOR PLATE RESISTOR
DOUBLE-SPOT TRIMMER
TRIMMER No. 1
No. 3 R. F. T.
No. 2 R. F. T.
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK
RED & BLUE
OSCILLATOR TRIMMER
RECTIFIER '80
FILTER RESISTOR
DIAL-LIGHT
HIGH VOLTAGE SECONDARY
PRIMARY
ON-OFF SWITCH
POWER TRANSFORMER
110-VOLT CABLE
FUSE
GREEN
LONG BLACK
YELLOW
RED
WHITE
GREEN RUB. COVERED
BLUE
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
SHORT BLACK
ANTENNA TRIMMER
No 1 R. F. T.
A
G
200

FIG. 288. DIAGRAM OF LATE-TYPE MODEL 84 AND 84-F (A. C.-OPERATED).

A few late-type Model 84 and 84-F receivers have slightly different oscillator transformers, as explained in the notes accompanying the parts list for these sets.
The filter resistor shown in the above diagram is NOT used in Model 84-F.
This set has a 1st-detector plate filter choke and condenser not shown in the diagram.

MODEL 85-Q

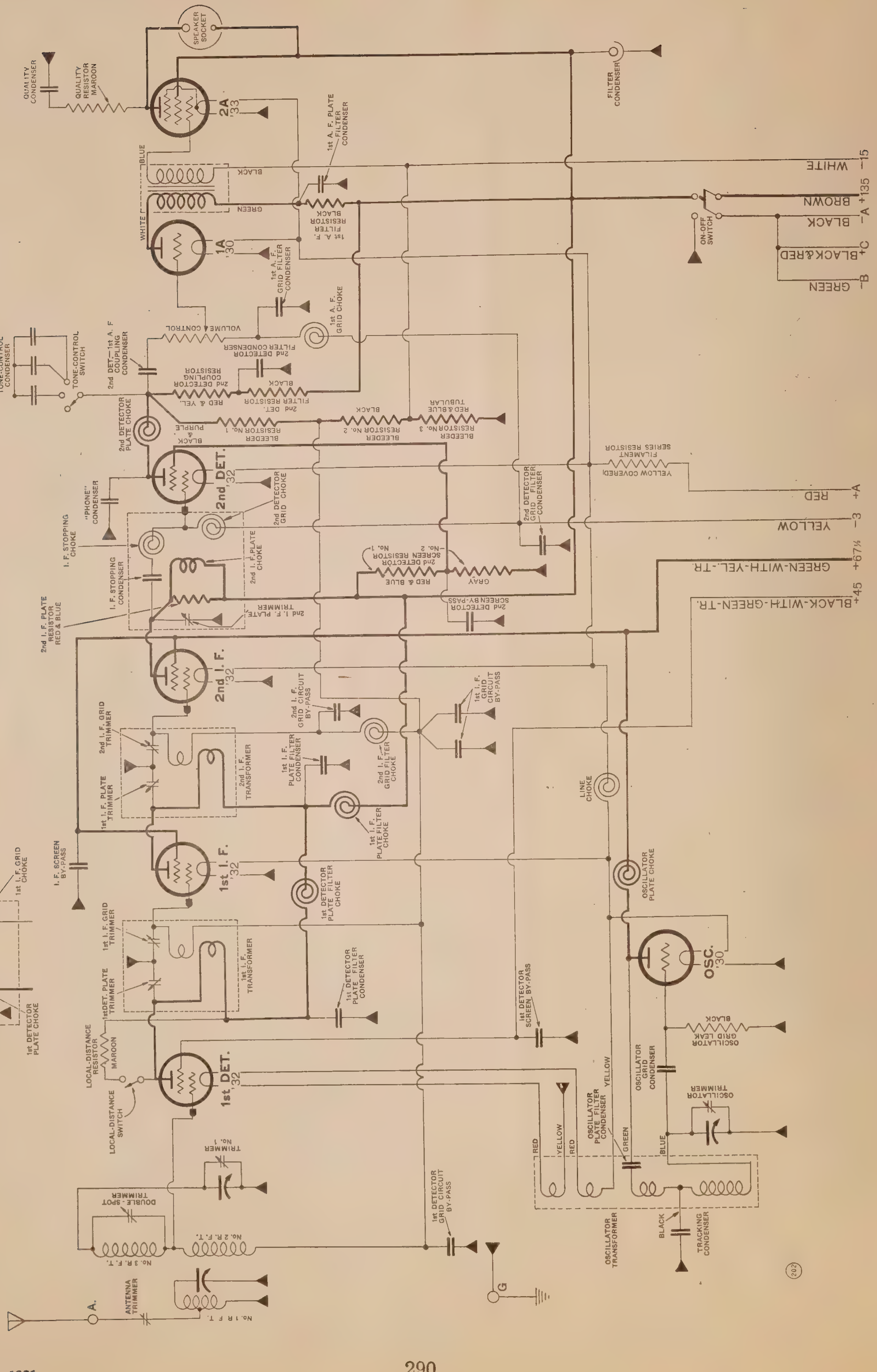

SPEAKER SOCKET
QUALITY CONDENSER
QUALITY RESISTOR MAROON
2A '33
FILTER CONDENSER
1st A. F. PLATE FILTER CONDENSER
BLUE
BLACK
WHITE
GREEN
1st A. F. FILTER RESISTOR BLACK
1A '30
1st A. F. GRID FILTER CONDENSER
1st A. F. GRID CHOKE
VOLUME CONTROL
2nd DETECTOR FILTER CONDENSER
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
2nd DET.—1st A. F. COUPLING CONDENSER
2nd DETECTOR COUPLING RESISTOR
BLACK
RED & YEL.
2nd DET. FILTER RESISTOR
TUBULAR RED & BLUE
BLACK
2nd DETECTOR PLATE CHOKE
BLACK & PURPLE
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 3
FILAMENT SERIES RESISTOR
YELLOW COVERED
2nd DET. '32
"PHONE" CONDENSER
2nd DETECTOR GRID CHOKE
2nd DETECTOR GRID FILTER CONDENSER
I. F. STOPPING CHOKE
2nd I. F. PLATE CHOKE
I. F. STOPPING CONDENSER
2nd DETECTOR SCREEN RESISTOR No. 1 No. 2
RED & BLUE
GRAY
2nd I. F. PLATE RESISTOR RED & BLUE
2nd I. F. PLATE TRIMMER
2nd DETECTOR SCREEN BY-PASS
2nd I. F. '32
2nd I. F. GRID CIRCUIT BY-PASS
1st I. F. GRID CIRCUIT BY-PASS
2nd I. F. GRID TRIMMER
1st I. F. PLATE TRIMMER
2nd I. F. TRANSFORMER
1st I. F. PLATE FILTER CONDENSER
2nd I. F. GRID FILTER CHOKE
1st I. F. PLATE FILTER CHOKE
LINE CHOKE
I. F. SCREEN BY-PASS
1st I. F. '32
I. F. STOPPING CONDENSER
1st I. F. GRID CHOKE
1st DETECTOR PLATE FILTER CHOKE
OSCILLATOR PLATE CHOKE
1st I. F. GRID TRIMMER
1st I. F. TRANSFORMER
1st DET. PLATE TRIMMER
1st DETECTOR PLATE FILTER CONDENSER
OSC. '30
I. F STOPPING CHOKE
1st DET. PLATE TRIMMER
1st DETECTOR PLATE CHOKE
1st DETECTOR SCREEN BY-PASS
OSCILLATOR GRID LEAK BLACK
LOCAL-DISTANCE RESISTOR MAROON
LOCAL-DISTANCE SWITCH
1st DET. '32
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
OSCILLATOR PLATE FILTER CONDENSER
YELLOW
RED
GREEN
BLUE
TRIMMER No. 1
DOUBLE-SPOT TRIMMER
No. 3 R. F. T.
No. 2 R. F. T.
1st DETECTOR GRID CIRCUIT BY-PASS
OSCILLATOR TRANSFORMER
BLACK
TRACKING CONDENSER
ANTENNA TRIMMER
No. 1 R. F. T.
A
G
ON-OFF SWITCH
WHITE −15
BROWN +135
BLACK −A
BLACK&RED +C
GREEN −B
RED +A
YELLOW −3
GREEN-WITH-YEL.-TR. +67½
BLACK-WITH-GREEN-TR. +45
202

FIG. 289. DIAGRAM OF MODEL 85-Q (BATTERY-OPERATED).

In later-type Model 85-Q, the 1st-I. F. transformer is replaced by chokes and condensers, as shown in the separate drawing above the 1st-I. F. transformer. In some 85-Q sets, the colors of the primary leads of the audio input transformer are reversed.

MODEL 86, 86-F

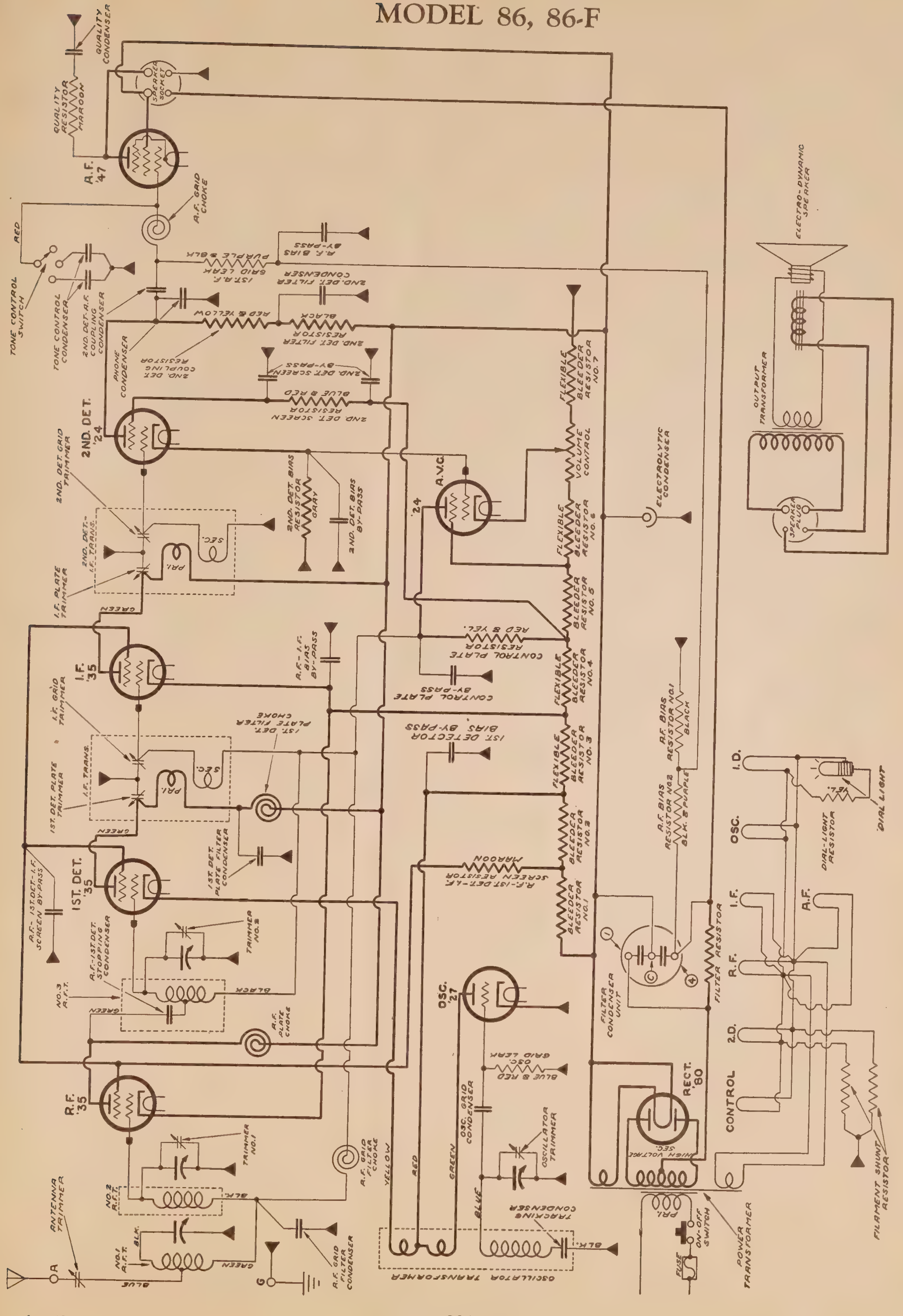

QUALITY CONDENSER
QUALITY RESISTOR MAROON
SPEAKER SOCKET
A.F. '47
A.F. GRID CHOKE
RED
TONE CONTROL SWITCH
TONE CONTROL CONDENSER
2ND. DET.-A.F. COUPLING CONDENSER
PHONE CONDENSER
2ND. DET. COUPLING RESISTOR
A.F. BIAS BY-PASS
PURPLE & BLK
1ST. A.F. GRID LEAK
2ND. DET. FILTER CONDENSER
RED & YELLOW
BLACK
2ND. DET. FILTER RESISTOR
2ND. DET. SCREEN BY-PASS
BLUE & RED
2ND. DET. SCREEN RESISTOR
2ND. DET. '24
2ND. DET. GRID TRIMMER
2ND. DET. BIAS RESISTOR GRAY
2ND. DET. BIAS BY-PASS
2ND. DET.-I.F. TRANS.
SEC.
PRI.
I.F. PLATE TRIMMER
GREEN
A.V.C. '24
VOLUME CONTROL
FLEXIBLE BLEEDER RESISTOR NO. 7
FLEXIBLE BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 5
FLEXIBLE BLEEDER RESISTOR NO. 4
FLEXIBLE BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
ELECTROLYTIC CONDENSER
RED & YEL.
CONTROL PLATE RESISTOR
CONTROL PLATE BY-PASS
I.F. '35
I.F. GRID TRIMMER
A.F.-I.F. BIAS BY-PASS
1ST. DET. PLATE FILTER CHOKE
1ST. DETECTOR BIAS BY-PASS
I.F. TRANS.
1ST. DET. PLATE TRIMMER
1ST. DET. PLATE FILTER CONDENSER
MAROON
R.F.-1ST. DET.-I.F. SCREEN RESISTOR
A.F. BIAS RESISTOR NO. 1 BLACK
A.F. BIAS RESISTOR NO. 2 BLK. & PURPLE
1ST. DET. '35
A.F.-1ST. DET.-I.F. SCREEN BY-PASS
R.F.-1ST. DET. STOPPING CONDENSER
TRIMMER NO. 3
NO. 3 R.F.T.
BLACK
R.F. PLATE CHOKE
OSC. '27
OSC. GRID LEAK
OSC. GRID CONDENSER
OSCILLATOR TRIMMER
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
YELLOW
RED
GREEN
BLUE
BLK.
FILTER CONDENSER UNIT
FILTER RESISTOR
RECT. '80
HIGH VOLTAGE SEC.
PRI.
ON-OFF SWITCH
FUSE
POWER TRANSFORMER
R.F. '35
TRIMMER NO. 1
NO. 2 R.F.T.
ANTENNA TRIMMER
NO. 1 R.F.T.
A.F. GRID FILTER CHOKE
A.F. GRID FILTER CONDENSER
A
G
I.D.
OSC.
I.F.
A.F.
R.F.
2.D.
CONTROL
DIAL LIGHT
DIAL-LIGHT RESISTOR
FILAMENT SHUNT RESISTOR
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG

FIG. 290. DIAGRAM OF MODEL 86 AND 86-F (A. C.-OPERATED).

The filter resistor is not used in Model 86-F, and the control plate resistor is red and gray. The electrolytic condenser is listed in the Parts List as filter condenser No. 3.

MODEL 87

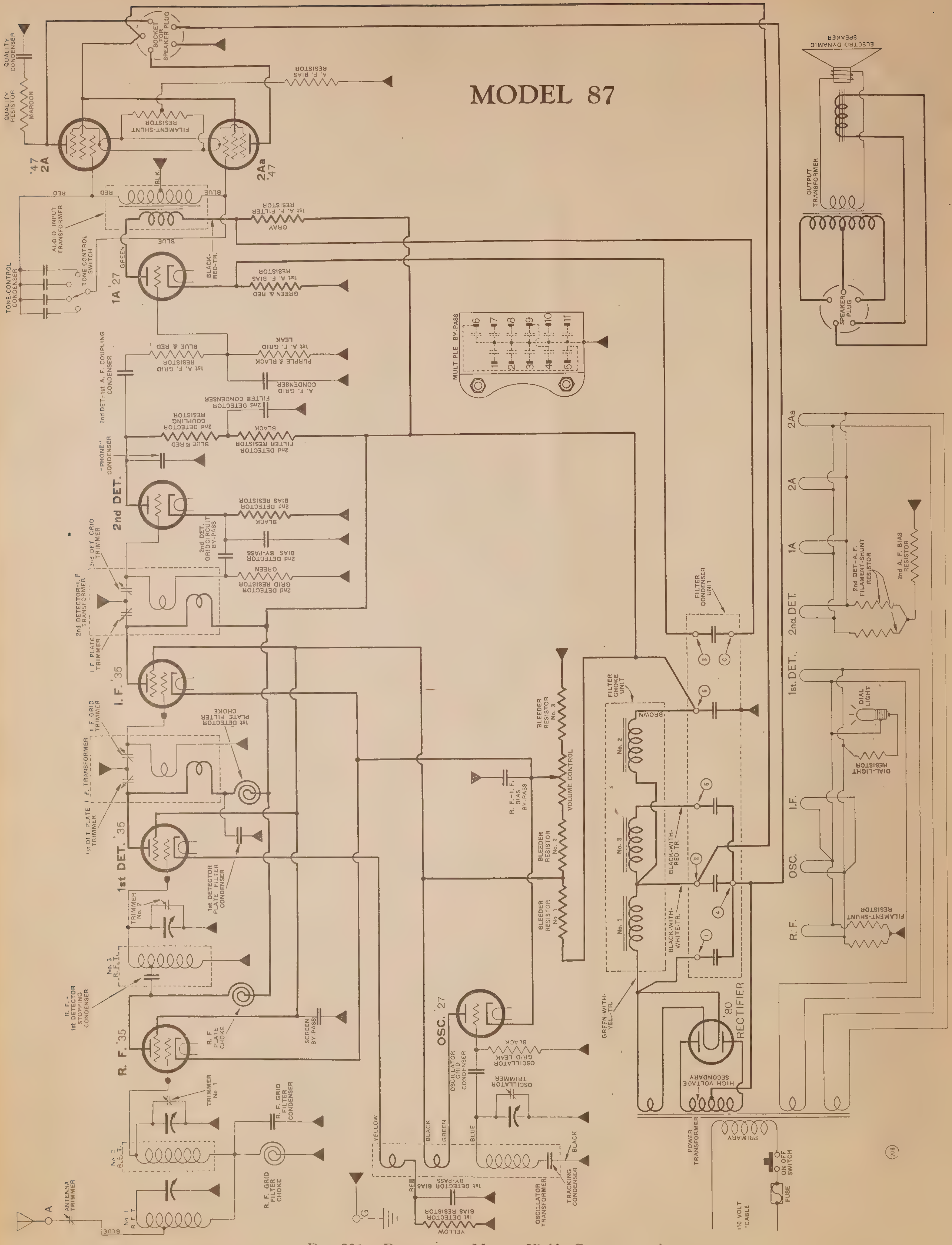

QUALITY CONDENSER
QUALITY RESISTOR
MAROON
SOCKET FOR SPEAKER PLUG
A. F. BIAS RESISTOR
FILAMENT-SHUNT RESISTOR
'47 2A
2Aa '47
RED
BLK.
BLUE
AUDIO INPUT TRANSFORMER
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
1st A. F. FILTER RESISTOR
GRAY
GREEN
BLACK-RED-TR.
1A '27
1st A. F. BIAS RESISTOR
GREEN & RED
1st A. F. GRID RESISTOR
BLUE & RED
1st A. F. GRID LEAK
PURPLE & BLACK
2nd DET.-1st A. F. COUPLING CONDENSER
A. F. GRID CONDENSER
2nd DETECTOR FILTER CONDENSER
2nd DETECTOR COUPLING RESISTOR
BLACK
2nd DETECTOR FILTER RESISTOR
"PHONE" CONDENSER
2nd DET.
2nd DETECTOR BIAS RESISTOR
2nd DET. GRID-CIRCUIT BY-PASS
2nd DETECTOR BIAS BY-PASS
2nd DETECTOR GRID RESISTOR
2nd DET. GRID TRIMMER
2nd DETECTOR-I. F. TRANSFORMER
I. F. PLATE TRIMMER
I. F. '35
1st DETECTOR PLATE FILTER CHOKE
I. F. GRID TRIMMER
I. F. TRANSFORMER
1st DET. PLATE TRIMMER
1st DET. '35
1st DETECTOR PLATE FILTER CONDENSER
TRIMMER No. 2
No. 3 R. F. T.
R. F.-1st DETECTOR STOPPING CONDENSER
R. F. '35
R. F. PLATE CHOKE
SCREEN BY-PASS
TRIMMER No. 1
R. F. GRID FILTER CONDENSER
No. 2 R. F. T.
R. F. GRID FILTER CHOKE
No. 1 R. F. T.
ANTENNA TRIMMER
A
G
BLUE
MULTIPLE BY-PASS
BLEEDER RESISTOR No. 3
VOLUME CONTROL
R. F.-I. F. BY-PASS
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
OSC. '27
OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
YELLOW
BLACK
GREEN
RED
1st DETECTOR BY-PASS
1st DETECTOR BIAS RESISTOR
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
BROWN
No. 2
No. 3
No. 1
BLACK-WITH-RED-TR.
BLACK-WITH-WHITE-TR.
GREEN-WITH-YEL.-TR.
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
POWER TRANSFORMER
PRIMARY
ON OFF SWITCH
FUSE
110 VOLT CABLE
ELECTRO DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
2Aa
2A
1A
2nd. DET.
1st. DET.
I.F.
OSC.
R. F.
2nd DET.-A. F. FILAMENT-SHUNT RESISTOR
2nd A. F. BIAS RESISTOR
DIAL LIGHT
DIAL-LIGHT RESISTOR
FILAMENT-SHUNT RESISTOR

FIG. 291. DIAGRAM OF MODEL 87 (A. C.-OPERATED).

In a few early-type Model 87 receivers, No. 2 and No. 3 R. F. transformers are connected between the R. F. tube and the 1st-detector, similar to the arrangement used in early Model 89 shown in Fig. 292.

MODEL 89, 89-F

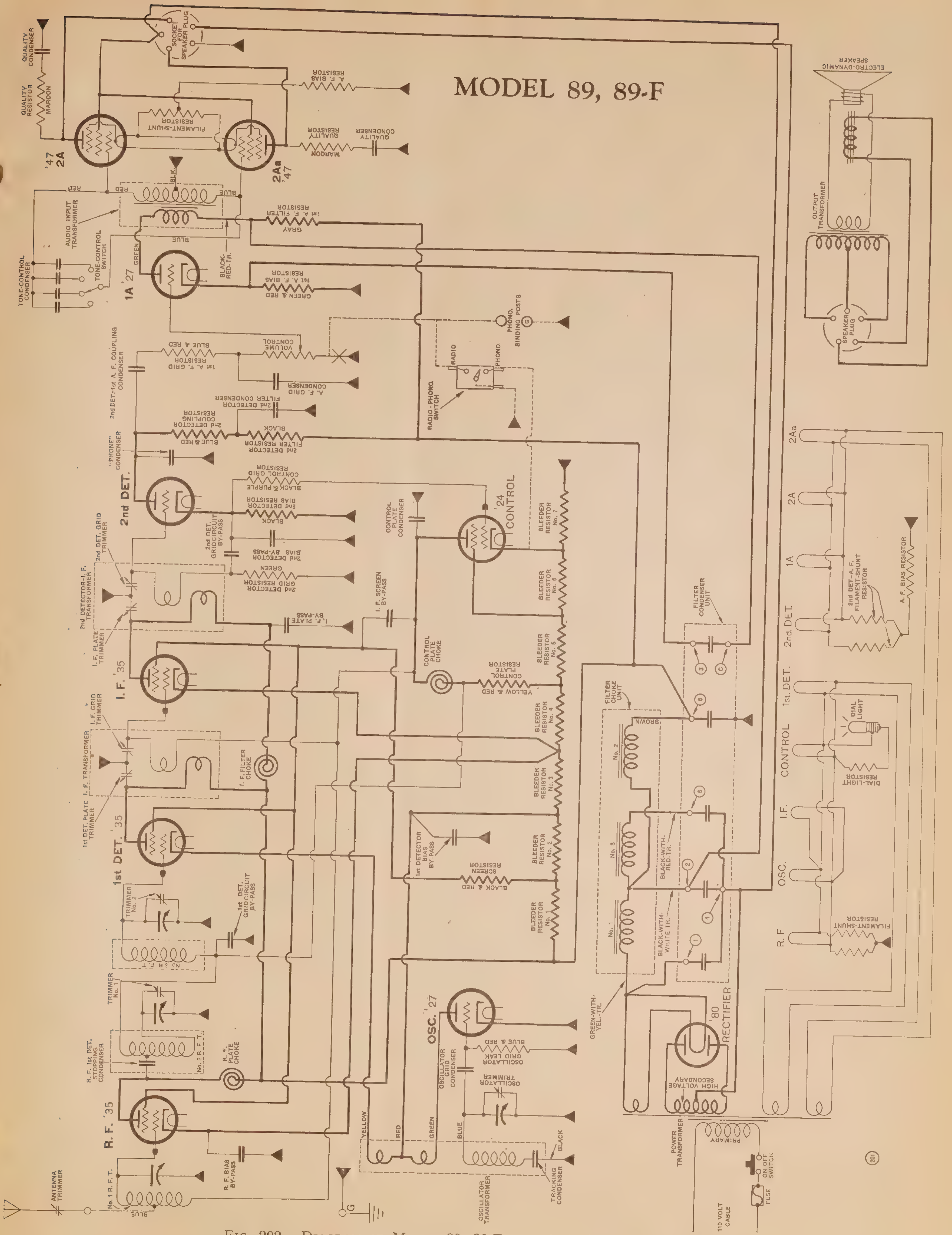

QUALITY CONDENSER
QUALITY RESISTOR MAROON
SOCKET FOR SPEAKER PLUG
A. F. BIAS RESISTOR
FILAMENT-SHUNT RESISTOR
QUALITY RESISTOR MAROON
QUALITY CONDENSER
'47 2A
2Aa '47
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
AUDIO INPUT TRANSFORMER
RED
BLK.
BLUE
1st A. F. FILTER RESISTOR GRAY
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
GREEN
BLACK-RED-TR.
1A '27
1st A. F. BIAS RESISTOR GREEN & RED
PHONO. BINDING POSTS
G
2nd DET-1st A. F. COUPLING CONDENSER
1st A. F. GRID RESISTOR BLUE & RED
VOLUME CONTROL
A. F. GRID CONDENSER
RADIO
PHONO.
RADIO-PHONO. SWITCH
2nd DETECTOR FILTER CONDENSER
2nd DETECTOR COUPLING RESISTOR BLUE & RED
2nd DETECTOR FILTER RESISTOR BLACK
"PHONE" CONDENSER
2nd DET.
CONTROL GRID RESISTOR BLACK & PURPLE
2nd DETECTOR BIAS RESISTOR BLACK
2nd DET. GRID-CIRCUIT BY-PASS
2nd DETECTOR BIAS BY-PASS
2nd DETECTOR GRID RESISTOR GREEN
2nd DET. GRID TRIMMER
2nd DETECTOR-I. F. TRANSFORMER
I. F. PLATE TRIMMER
I. F. PLATE BY-PASS
I. F. SCREEN BY-PASS
CONTROL PLATE CONDENSER
'24 CONTROL
BLEEDER RESISTOR No. 7
BLEEDER RESISTOR No. 6
BLEEDER RESISTOR No. 5
BLEEDER RESISTOR No. 4
BLEEDER RESISTOR No. 3
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
CONTROL PLATE CHOKE
CONTROL PLATE RESISTOR YELLOW & RED
I. F. '35
I. F. GRID TRIMMER
I. F. TRANSFORMER
I. F. FILTER CHOKE
1st DET. PLATE TRIMMER
1st DET. '35
1st DETECTOR BIAS BY-PASS
SCREEN RESISTOR BLACK & RED
TRIMMER No. 2
1st DET. GRID-CIRCUIT BY-PASS
No. 3 R. F. T.
TRIMMER No. 1
No. 2 R. F. T.
R. F. 1st DET. STOPPING CONDENSER
R. F. PLATE CHOKE
R. F. '35
R. F. BIAS BY-PASS
ANTENNA TRIMMER
No. 1 R. F. T.
BLUE
G
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK BLUE & RED
OSCILLATOR TRIMMER
YELLOW
RED
GREEN
BLUE
BLACK
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
BROWN
No. 2
No. 3
No. 1
BLACK-WITH-RED-TR.
BLACK-WITH-WHITE TR.
GREEN-WITH-YEL.-TR.
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
POWER TRANSFORMER
PRIMARY
ON OFF SWITCH
FUSE
110 VOLT CABLE
2Aa
2A
1A
2nd DET.
1st. DET.
CONTROL
I. F.
OSC.
R. F
A. F. BIAS RESISTOR
2nd DET-A. F. FILAMENT-SHUNT RESISTOR
DIAL LIGHT
DIAL-LIGHT RESISTOR
FILAMENT-SHUNT RESISTOR
201

FIG. 292. DIAGRAM OF MODEL 89, 89-F, AND 89-P (A. C.-OPERATED).

IMPORTANT: The 2nd-detector grid resistor and the 2nd-detector grid-circuit by-pass are NOT used in this set, and the grid-return of the 2nd-detector connects directly to the chassis.

Later types of this Model have No. 1 and No. 2 R. F. transformers connected **ahead** of the R. F. tube, as shown in the diagram of Model 87 in Fig. 291.
The phonograph equipment, circuit, and parts in Model 89-P are the same as described on pages 236 to 240 of the Service Manual.
The phonograph-switching circuit in 89-P is shown above in dotted lines.

MODEL 80, 80-F, 82, 82-F TOP VIEW
MODEL 80, 80-F CHART

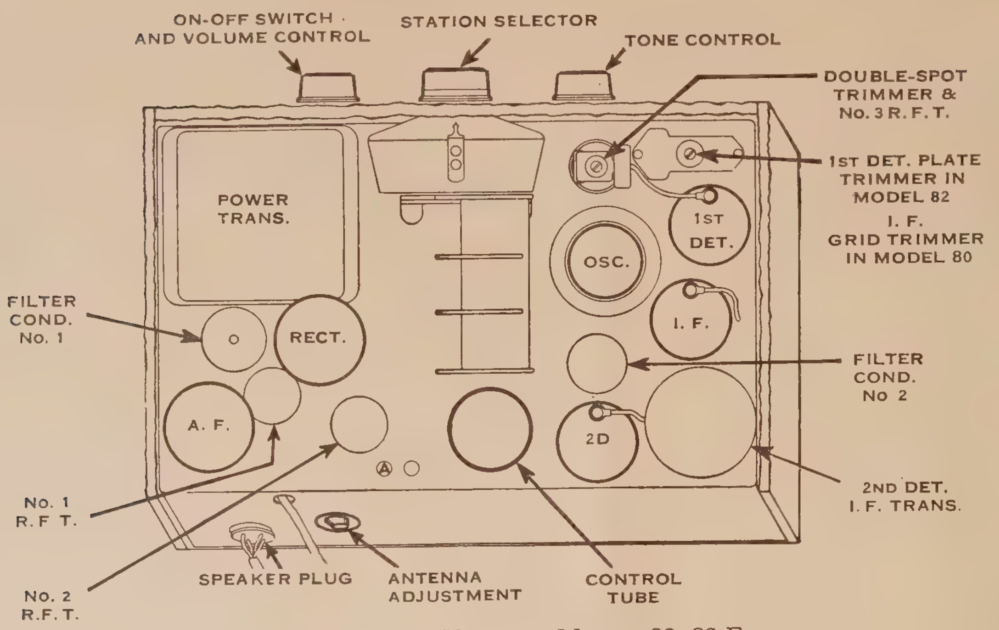

ON-OFF SWITCH AND VOLUME CONTROL
STATION SELECTOR
TONE CONTROL
DOUBLE-SPOT TRIMMER & No. 3 R. F. T.
1ST DET. PLATE TRIMMER IN MODEL 82
I. F. GRID TRIMMER IN MODEL 80
POWER TRANS.
1ST DET.
OSC.
I. F.
FILTER COND. No. 1
RECT.
FILTER COND. No 2
A. F.
2D
2ND DET. I. F. TRANS.
No. 1 R. F T.
No. 2 R.F.T.
SPEAKER PLUG
ANTENNA ADJUSTMENT
CONTROL TUBE

Fig. 293. Top View of Model 82, 82-F.

The top view of Model 80, 80-F is similar except that it has no control tube and the position of No. 1 and No. 2 R. F. T. is interchanged.

Condensers in Multiple By-pass Model 80, 80-F, 83, 83-F

1—Tone-control condenser.
2—Tone-control condenser.
3—1st-detector—I. F. screen by-pass.
4—I. F. bias by-pass.
5—2nd-detector bias by-pass.
6—Phone condenser.
7—2nd-detector—A. F. coupling condenser.
8—2nd-detector screen by-pass.
9—Quality condenser.
10—1st-detector plate filter condenser.
11—A. F. bias by-pass.
12—1st-detector bias by-pass.

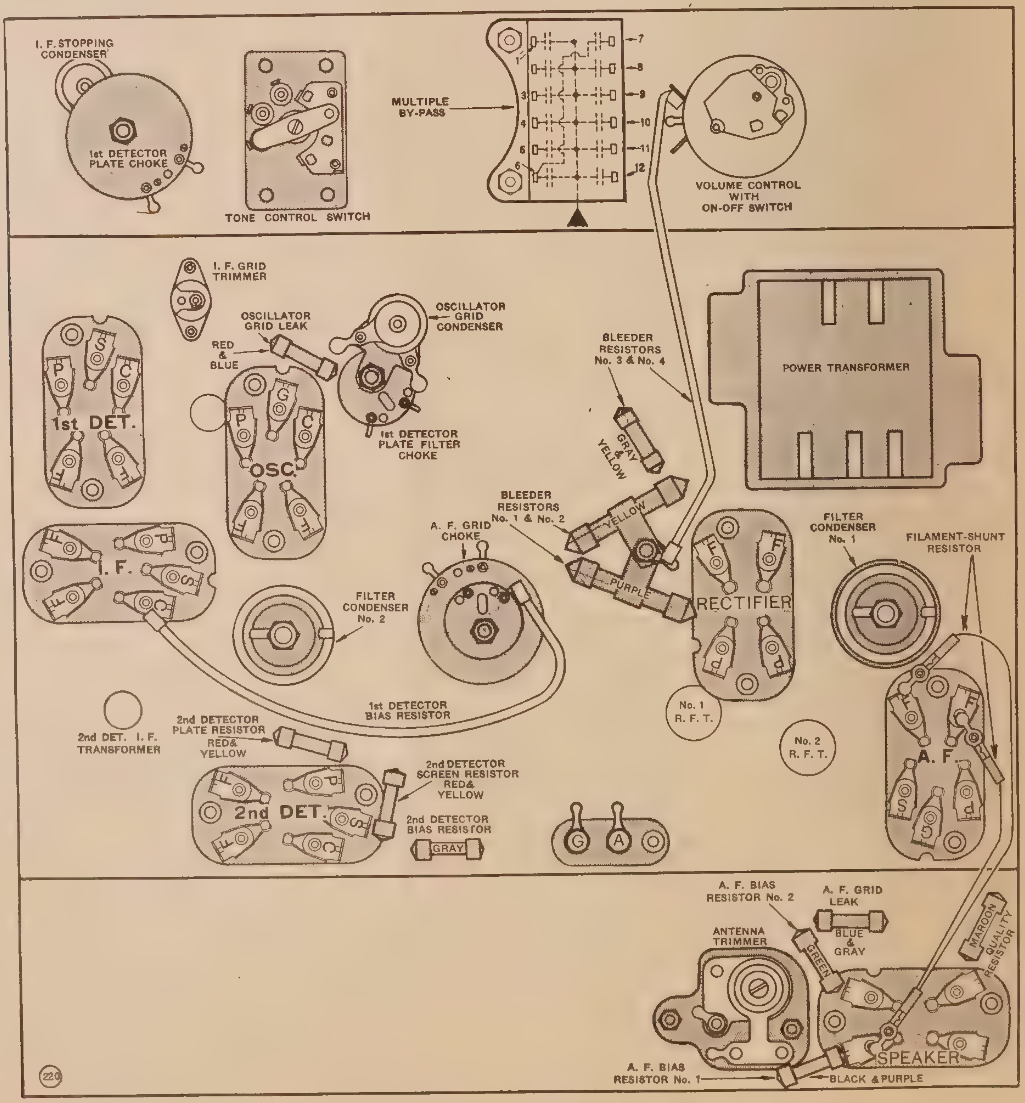

I. F. STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
TONE CONTROL SWITCH
MULTIPLE BY-PASS
1
3
4
5
6
7
8
9
10
11
12
VOLUME CONTROL WITH ON-OFF SWITCH
I. F. GRID TRIMMER
OSCILLATOR GRID LEAK
RED & BLUE
OSCILLATOR GRID CONDENSER
1st DETECTOR PLATE FILTER CHOKE
BLEEDER RESISTORS No. 3 & No. 4
GRAY & YELLOW
POWER TRANSFORMER
1st DET.
OSC.
S P C F F G
I. F.
BLEEDER RESISTORS No. 1 & No. 2
YELLOW
PURPLE
A. F. GRID CHOKE
FILTER CONDENSER No. 2
RECTIFIER
FILTER CONDENSER No. 1
FILAMENT-SHUNT RESISTOR
1st DETECTOR BIAS RESISTOR
No. 1 R. F. T.
No. 2 R. F. T.
2nd DET. I. F. TRANSFORMER
2nd DETECTOR PLATE RESISTOR RED& YELLOW
2nd DETECTOR SCREEN RESISTOR RED& YELLOW
2nd DET.
2nd DETECTOR BIAS RESISTOR
GRAY
G
A
A. F.
A. F. BIAS RESISTOR No. 2
A. F. GRID LEAK
BLUE & GRAY
ANTENNA TRIMMER
GREEN
MAROON
QUALITY RESISTOR
SPEAKER
A. F. BIAS RESISTOR No. 1
BLACK & PURPLE
220

Fig. 294. Chart of Model 80, 80-F.

The parts on Model 83, 83-F are similar except that Model 83, 83-F has a filter condenser unit and only one electrolytic condenser.

MODEL 83, 83-F TOP VIEW
MODEL 82, 82-F CHART

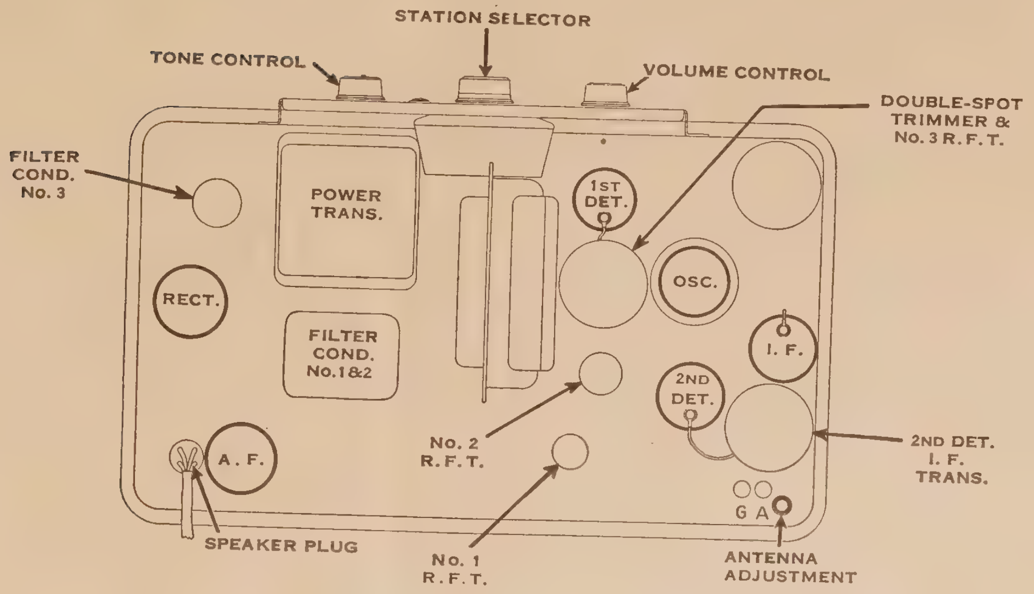

STATION SELECTOR
TONE CONTROL
VOLUME CONTROL
DOUBLE-SPOT TRIMMER & No. 3 R. F. T.
FILTER COND. No. 3
POWER TRANS.
1ST DET.
OSC.
RECT.
FILTER COND. No. 1 & 2
I. F.
2ND DET.
No. 2 R. F. T.
2ND DET. I. F. TRANS.
A. F.
G A
SPEAKER PLUG
No. 1 R. F. T.
ANTENNA ADJUSTMENT

FIG. 295. TOP VIEW OF MODEL 83, 83-F.

The circle in the upper right-hand corner is the shield that covers the coupling unit between the 1st-detector and the I. F. tubes.

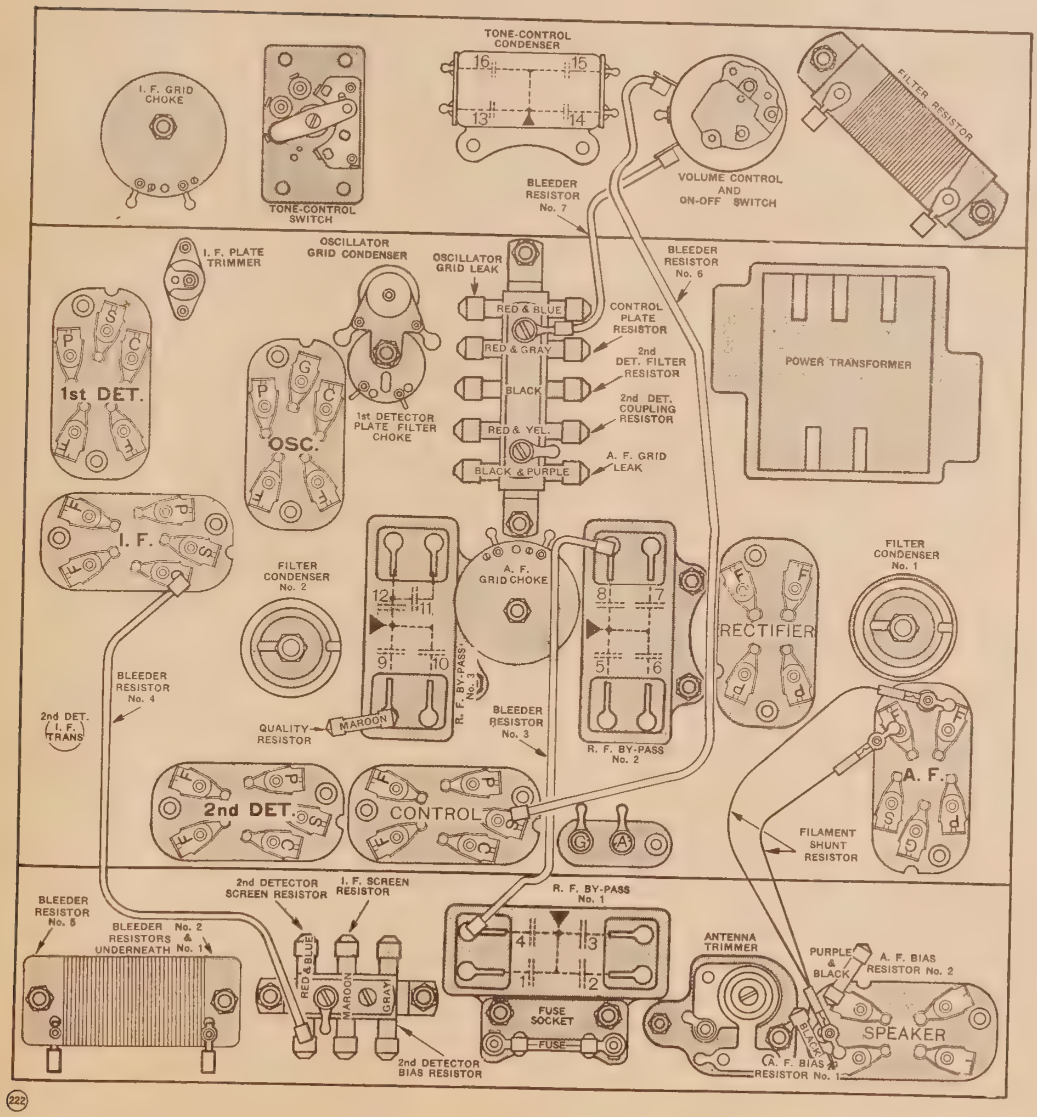

I. F. GRID CHOKE
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
16
15
13
14
VOLUME CONTROL AND ON-OFF SWITCH
FILTER RESISTOR
BLEEDER RESISTOR No. 7
I. F. PLATE TRIMMER
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK
BLEEDER RESISTOR No. 6
RED & BLUE
RED & GRAY
BLACK
RED & YEL.
BLACK & PURPLE
CONTROL PLATE RESISTOR
2nd DET. FILTER RESISTOR
2nd DET. COUPLING RESISTOR
A. F. GRID LEAK
POWER TRANSFORMER
1st DET.
P
S
C
F
F
OSC.
G
1st DETECTOR PLATE FILTER CHOKE
I. F.
FILTER CONDENSER No. 2
A. F. GRID CHOKE
12
11
9
10
8
7
5
6
R. F. BY-PASS No. 3
R. F. BY-PASS No. 2
RECTIFIER
FILTER CONDENSER No. 1
BLEEDER RESISTOR No. 4
2nd DET. I. F. TRANS
QUALITY RESISTOR
MAROON
BLEEDER RESISTOR No. 3
2nd DET.
CONTROL
G
A
A. F.
FILAMENT SHUNT RESISTOR
BLEEDER RESISTOR No. 5
BLEEDER RESISTORS No. 2 & No. 1 UNDERNEATH
2nd DETECTOR SCREEN RESISTOR
I. F. SCREEN RESISTOR
RED & BLUE
MAROON
GRAY
2nd DETECTOR BIAS RESISTOR
R. F. BY-PASS No. 1
4
3
1
2
FUSE SOCKET
FUSE
ANTENNA TRIMMER
PURPLE & BLACK
A. F. BIAS RESISTOR No. 2
BLACK
A. F. BIAS RESISTOR No. 1
SPEAKER
222

FIG. 296. CHART OF MODEL 82, 82-F.

The filter resistor is not used in Model 82-F.

By-pass Condensers in Model 82, 82-F

R. F. By-pass No. 1

1—2nd-detector bias by-pass.
2—Control plate by-pass.
3—Not used.
4—I. F. bias by-pass.

R. F. By-pass No. 2

5—1st-detector filter condenser.
6—1st-detector—I. F. screen by-pass.
7—2nd-detector filter condenser.
8—1st-detector bias by-pass.

R. F. By-pass No. 3

9—Quality condenser.
10—A. F. bias by-pass.
11—2nd-detector—A. F. coupling condenser.
12—Phone condenser.

Tone-control Condenser

13—Tone condenser.
14—2nd-detector screen by-pass.
15—Oscillator plate-circuit by-pass.
16—Tone condenser.

MODEL 82-D TOP VIEW AND CHART

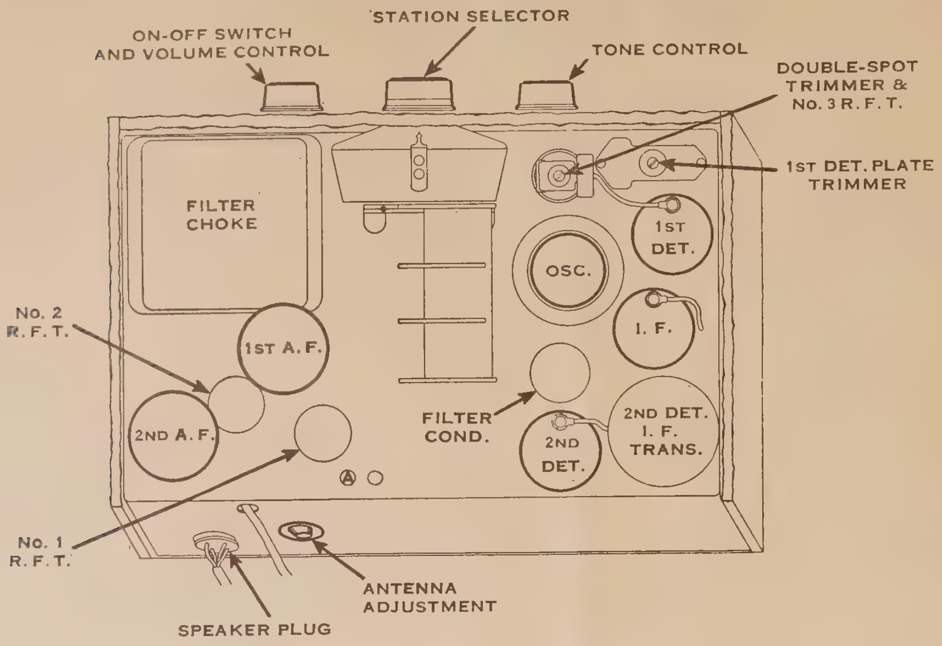

STATION SELECTOR
ON-OFF SWITCH AND VOLUME CONTROL
TONE CONTROL
DOUBLE-SPOT TRIMMER & No. 3 R. F. T.
1ST DET. PLATE TRIMMER
FILTER CHOKE
1ST DET.
OSC.
I. F.
No. 2 R. F. T.
1ST A. F.
2ND A. F.
FILTER COND.
2ND DET.
2ND DET. I. F. TRANS.
No. 1 R. F. T.
ANTENNA ADJUSTMENT
SPEAKER PLUG

FIG. 297. TOP VIEW OF MODEL 82-D.

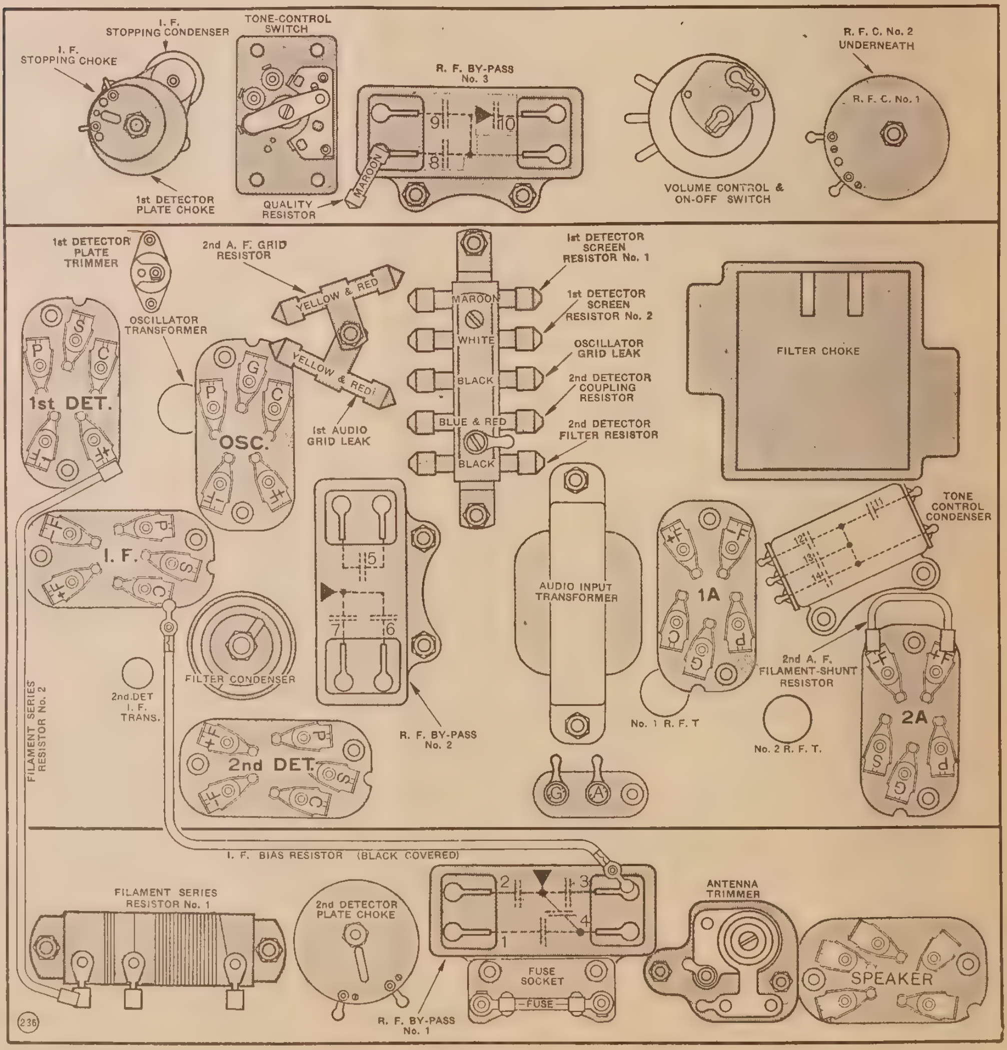

I. F. STOPPING CONDENSER
I. F. STOPPING CHOKE
TONE-CONTROL SWITCH
R. F. BY-PASS No. 3
9
10
8
MAROON
R. F. C. No. 2 UNDERNEATH
R. F. C. No. 1
1st DETECTOR PLATE CHOKE
QUALITY RESISTOR
VOLUME CONTROL & ON-OFF SWITCH
1st DETECTOR PLATE TRIMMER
2nd A. F. GRID RESISTOR
YELLOW & RED
YELLOW & RED
1st DETECTOR SCREEN RESISTOR No. 1
1st DETECTOR SCREEN RESISTOR No. 2
OSCILLATOR GRID LEAK
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
MAROON
WHITE
BLACK
BLUE & RED
BLACK
OSCILLATOR TRANSFORMER
1st DET.
S
P
C
F
F
OSC.
G
P
C
1st AUDIO GRID LEAK
FILTER CHOKE
TONE CONTROL CONDENSER
11
12
13
14
I. F.
P
S
C
F
F
5
7
6
AUDIO INPUT TRANSFORMER
1A
2A
FILTER CONDENSER
2nd DET I. F. TRANS.
FILAMENT SERIES RESISTOR No. 2
R. F. BY-PASS No. 2
No. 1 R. F. T
2nd A. F. FILAMENT-SHUNT RESISTOR
No. 2 R. F. T.
2nd DET.
G
A
I. F. BIAS RESISTOR (BLACK COVERED)
FILAMENT SERIES RESISTOR No. 1
2nd DETECTOR PLATE CHOKE
2
3
4
1
FUSE SOCKET
FUSE
R. F. BY-PASS No. 1
ANTENNA TRIMMER
SPEAKER
236

FIG. 298. CHART OF MODEL 82-D.

By-pass Condensers in Model 82-D

R. F. By-pass No. 1

1—Ground coupling condenser.
2—1st-detector screen by-pass.
3—110-volt line condenser.
4—1st-detector grid by-pass.

R. F. By-pass No. 2

5—2nd-detector—1st-A.F. coupling condenser.
6—Filter condenser No. 2.
7—Not used.

R. F. By-pass No. 3

8—Quality condenser.
9—2nd-detector filter condenser.
10—110-volt line by-pass.

Tone-control Condenser

11—Not used.
12—Tone condenser.
13—Tone condenser.
14—Tone condenser.

MODEL 82-Q TOP VIEW AND CHART

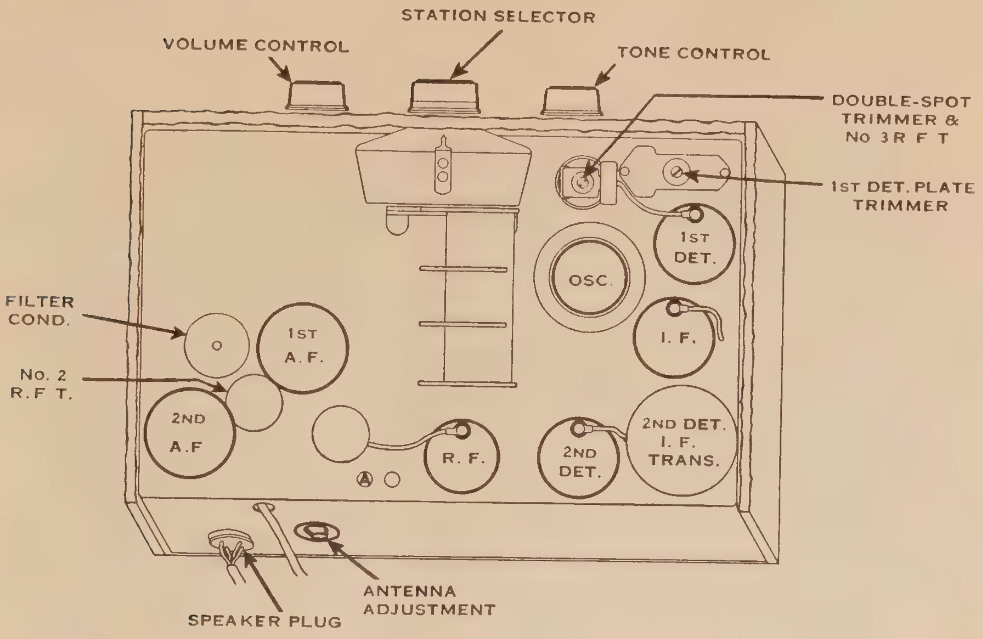

STATION SELECTOR
VOLUME CONTROL
TONE CONTROL
DOUBLE-SPOT TRIMMER & No 3 R F T
1ST DET. PLATE TRIMMER
1ST DET.
OSC.
I. F.
FILTER COND.
1ST A.F.
No. 2 R.F.T.
2ND A.F
R. F.
2ND DET.
2ND DET. I. F. TRANS.
ANTENNA ADJUSTMENT
SPEAKER PLUG

Fig. 299. Top View of Model 82-Q.

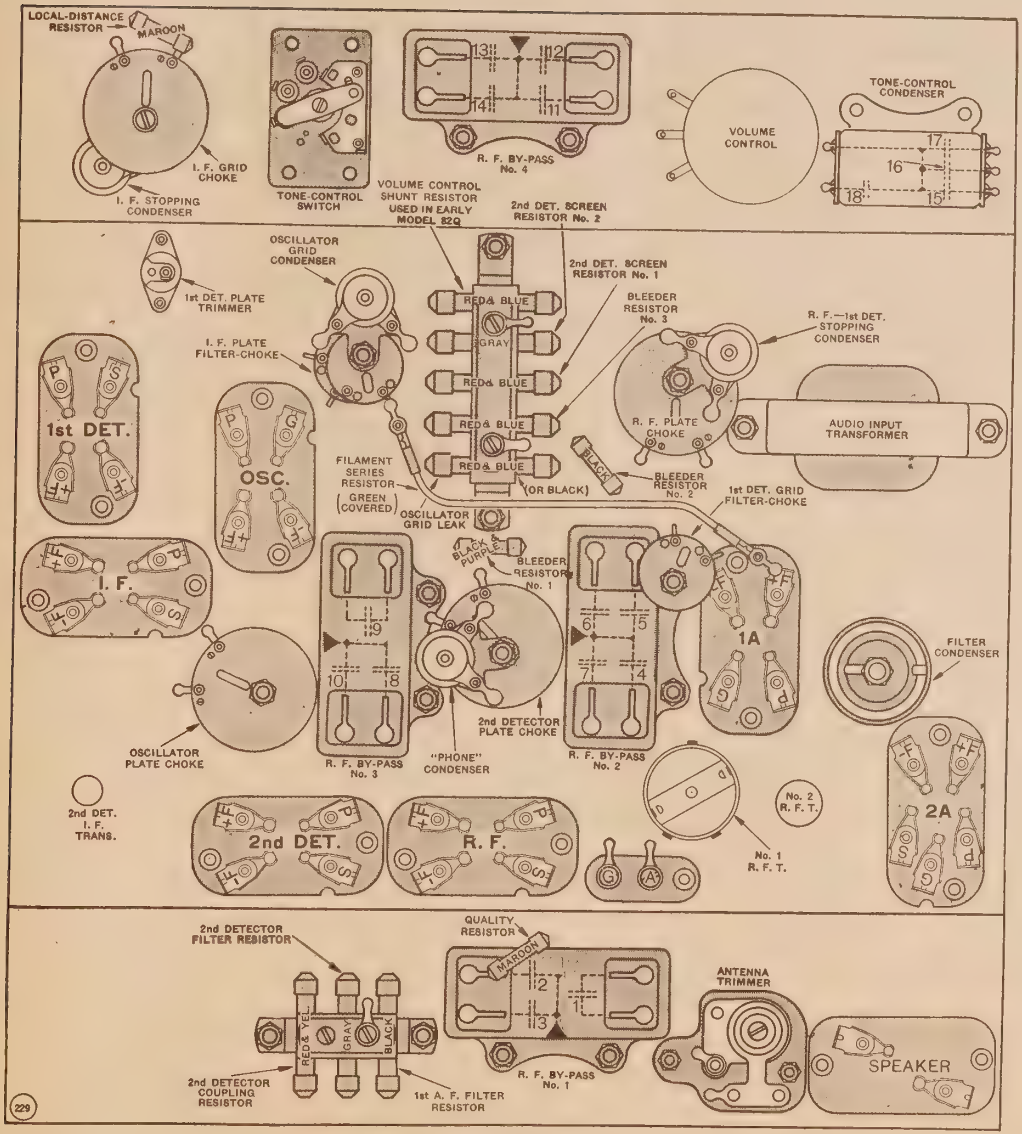

LOCAL-DISTANCE RESISTOR
MAROON
I. F. GRID CHOKE
I. F. STOPPING CONDENSER
TONE-CONTROL SWITCH
13
12
14
11
R. F. BY-PASS No. 4
VOLUME CONTROL
TONE-CONTROL CONDENSER
17
16
18
15
VOLUME CONTROL SHUNT RESISTOR USED IN EARLY MODEL 82Q
2nd DET. SCREEN RESISTOR No. 2
OSCILLATOR GRID CONDENSER
1st DET. PLATE TRIMMER
2nd DET. SCREEN RESISTOR No. 1
BLEEDER RESISTOR No. 3
R. F.—1st DET. STOPPING CONDENSER
I. F. PLATE FILTER-CHOKE
RED & BLUE
GRAY
RED & BLUE
RED & BLUE
RED & BLUE
(OR BLACK)
BLACK
R. F. PLATE CHOKE
AUDIO INPUT TRANSFORMER
1st DET.
P
S
+F
-F
OSC.
P
G
+F
-F
FILAMENT SERIES RESISTOR (GREEN COVERED)
OSCILLATOR GRID LEAK
BLEEDER RESISTOR No. 2
1st DET. GRID FILTER-CHOKE
BLACK & PURPLE
BLEEDER RESISTOR No. 1
I. F.
+F
P
-F
S
9
10
8
6
5
7
4
1A
-F
+F
G
P
FILTER CONDENSER
OSCILLATOR PLATE CHOKE
R. F. BY-PASS No. 3
"PHONE" CONDENSER
2nd DETECTOR PLATE CHOKE
R. F. BY-PASS No. 2
2nd DET. I. F. TRANS.
No. 2 R. F. T.
2A
-F
+F
S
G
P
2nd DET.
+F
P
-F
S
R. F.
+F
P
-F
S
G
A
No. 1 R. F. T.
2nd DETECTOR FILTER RESISTOR
QUALITY RESISTOR
MAROON
2
1
3
ANTENNA TRIMMER
RED & YEL.
GRAY
BLACK
2nd DETECTOR COUPLING RESISTOR
1st A. F. FILTER RESISTOR
R. F. BY-PASS No. 1
SPEAKER
229

Fig. 300. Chart of Model 82-Q.

By-pass Condensers in Model 82-Q

R. F. By-pass No. 1

1—Not used.
2—Quality condenser.
3—2nd-detector grid-circuit by-pass.

R. F. By-pass No. 2

4—+B filter condenser.
5—R. F. grid-circuit by-pass.
6—R. F.—I. F. screen by-pass.
7—1st-detector grid-circuit by-pass.

R. F. By-pass No. 3

8—2nd-detector filter condenser.
9—2nd-detector—1st-A. F. coupling condenser.
10—Tracking condenser.

R. F. By-pass No. 4

11—2nd-detector screen by-pass.
12—1st-A. F. filter condenser.
13—1st-detector screen by-pass.
14—I. F. plate filter condenser.

Tone-control Condenser

15—Tone condenser.
16—Tone condenser.
17—Tone condenser.
18—Not used.

MODEL 84, 84-F---TOP VIEW

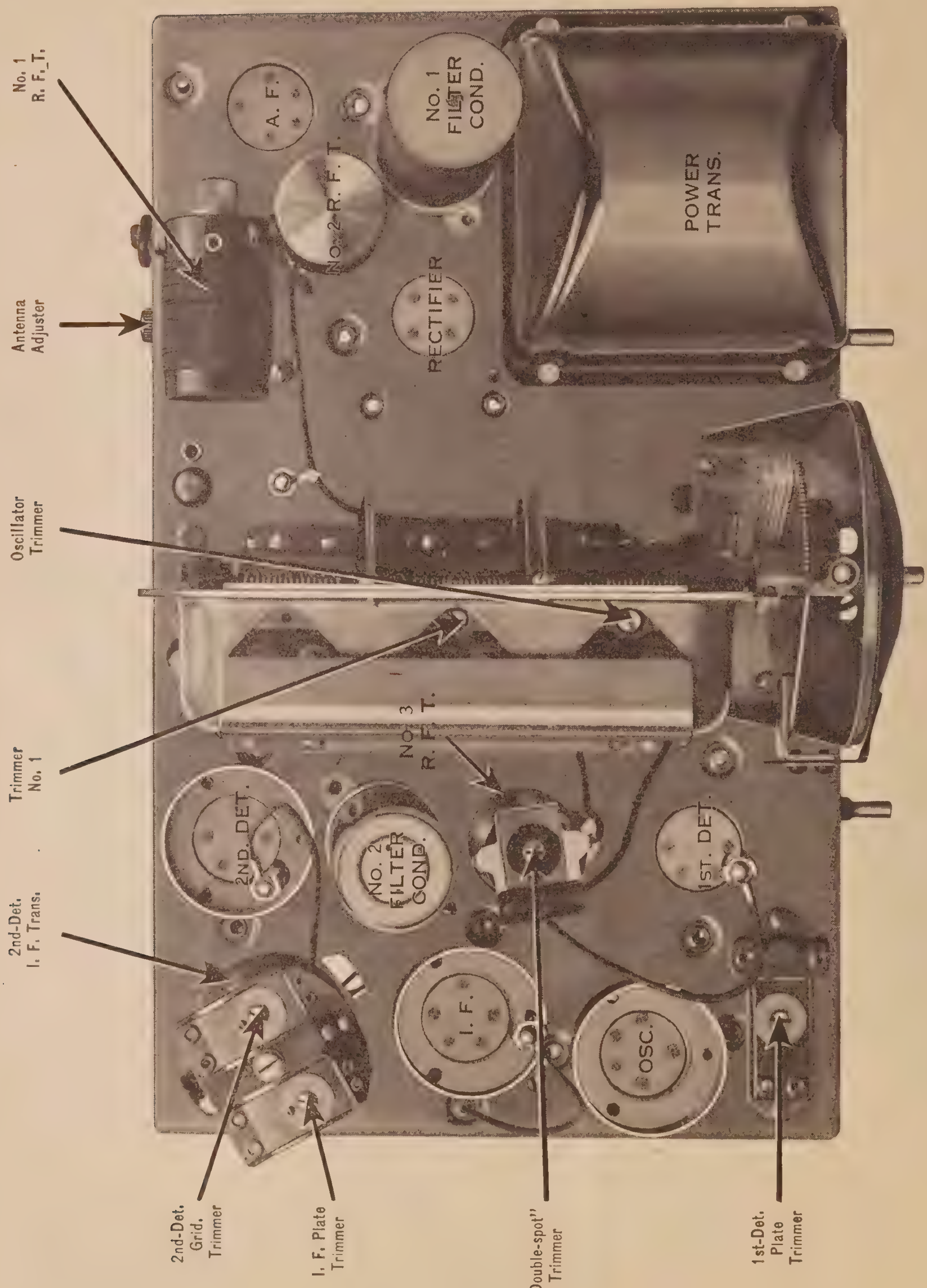

No. 1
R. F. T.
Antenna
Adjuster
Oscillator
Trimmer
Trimmer
No. 1
2nd-Det.
I. F. Trans.
2nd-Det.
Grid.
Trimmer
I. F. Plate
Trimmer
"Double-spot"
Trimmer
1st-Det.
Plate
Trimmer
A. F.
No. 1
FILTER
COND.
POWER
TRANS.
No. 2 R. F. T.
RECTIFIER
No. 3
R. F. T.
2ND. DET.
No. 2
FILTER
COND.
1ST. DET.
I. F.
OSC.

FIG. 301. TOP VIEW OF MODEL 84, 84-F CHASSIS.

MODEL 84, 84-F CHARTS

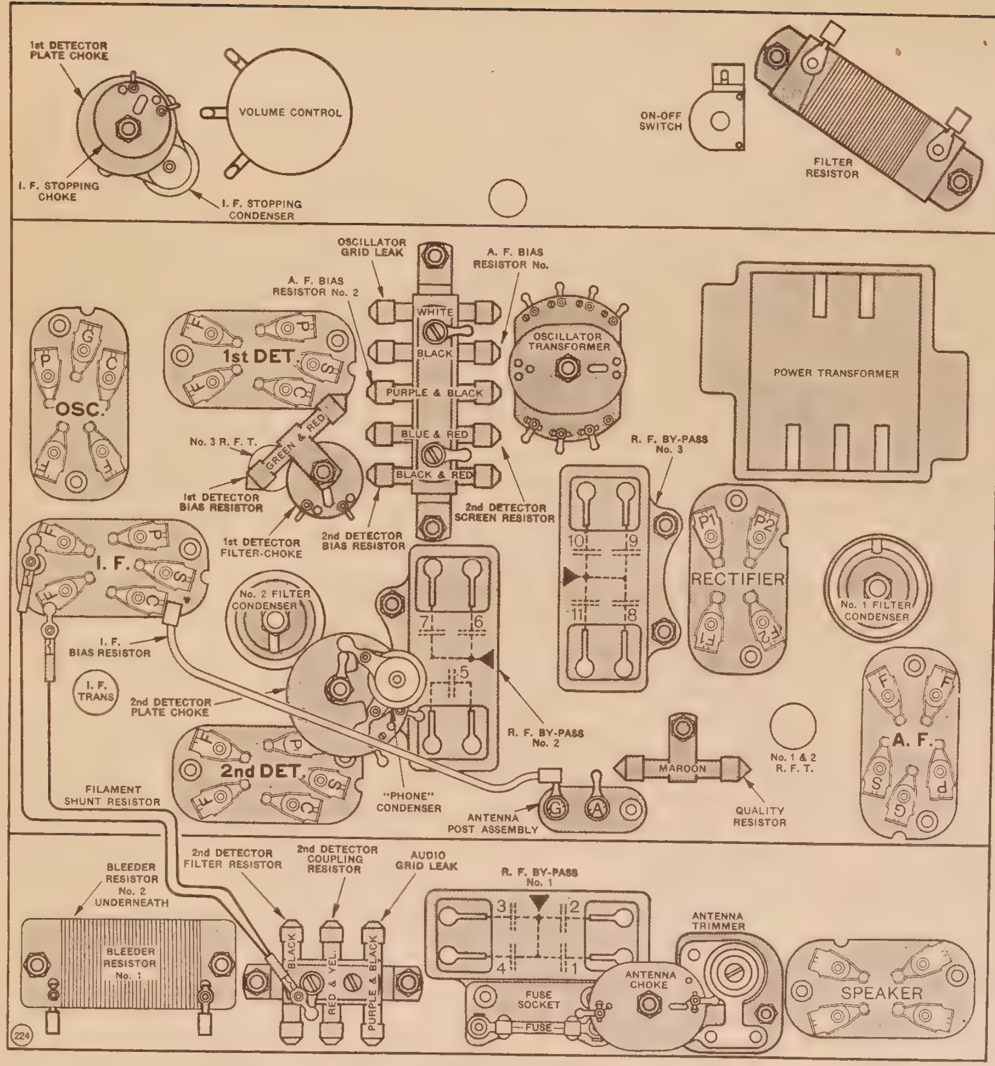

1st DETECTOR PLATE CHOKE
VOLUME CONTROL
ON-OFF SWITCH
FILTER RESISTOR
I. F. STOPPING CHOKE
I. F. STOPPING CONDENSER
OSCILLATOR GRID LEAK
A. F. BIAS RESISTOR No.
A. F. BIAS RESISTOR No. 2
WHITE
BLACK
PURPLE & BLACK
BLUE & RED
BLACK & RED
OSCILLATOR TRANSFORMER
POWER TRANSFORMER
OSC.
1st DET
No. 3 R. F. T.
GREEN & RED
1st DETECTOR BIAS RESISTOR
1st DETECTOR FILTER-CHOKE
2nd DETECTOR BIAS RESISTOR
2nd DETECTOR SCREEN RESISTOR
R. F. BY-PASS No. 3
RECTIFIER
No. 1 FILTER CONDENSER
I. F.
No. 2 FILTER CONDENSER
I. F. BIAS RESISTOR
I. F. TRANS
2nd DETECTOR PLATE CHOKE
R. F. BY-PASS No. 2
No. 1 & 2 R. F. T.
A. F.
2nd DET.
"PHONE" CONDENSER
ANTENNA POST ASSEMBLY
MAROON
QUALITY RESISTOR
FILAMENT SHUNT RESISTOR
BLEEDER RESISTOR No. 2 UNDERNEATH
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR COUPLING RESISTOR
AUDIO GRID LEAK
R. F. BY-PASS No. 1
ANTENNA TRIMMER
BLEEDER RESISTOR No. 1
BLACK
RED & YEL.
PURPLE & BLACK
FUSE SOCKET
FUSE
ANTENNA CHOKE
SPEAKER
224

FIG. 302. CHART OF EARLY-TYPE MODEL 84, 84-F.

In some early-type Model 84, 84-F, the 1st-detector bias resistor is a flexible type, and the quality resistor is wire-wound. These are both superseded by the tubular resistors indicated above. The filter-resistor at top-right is NOT used in any Model 84-F.

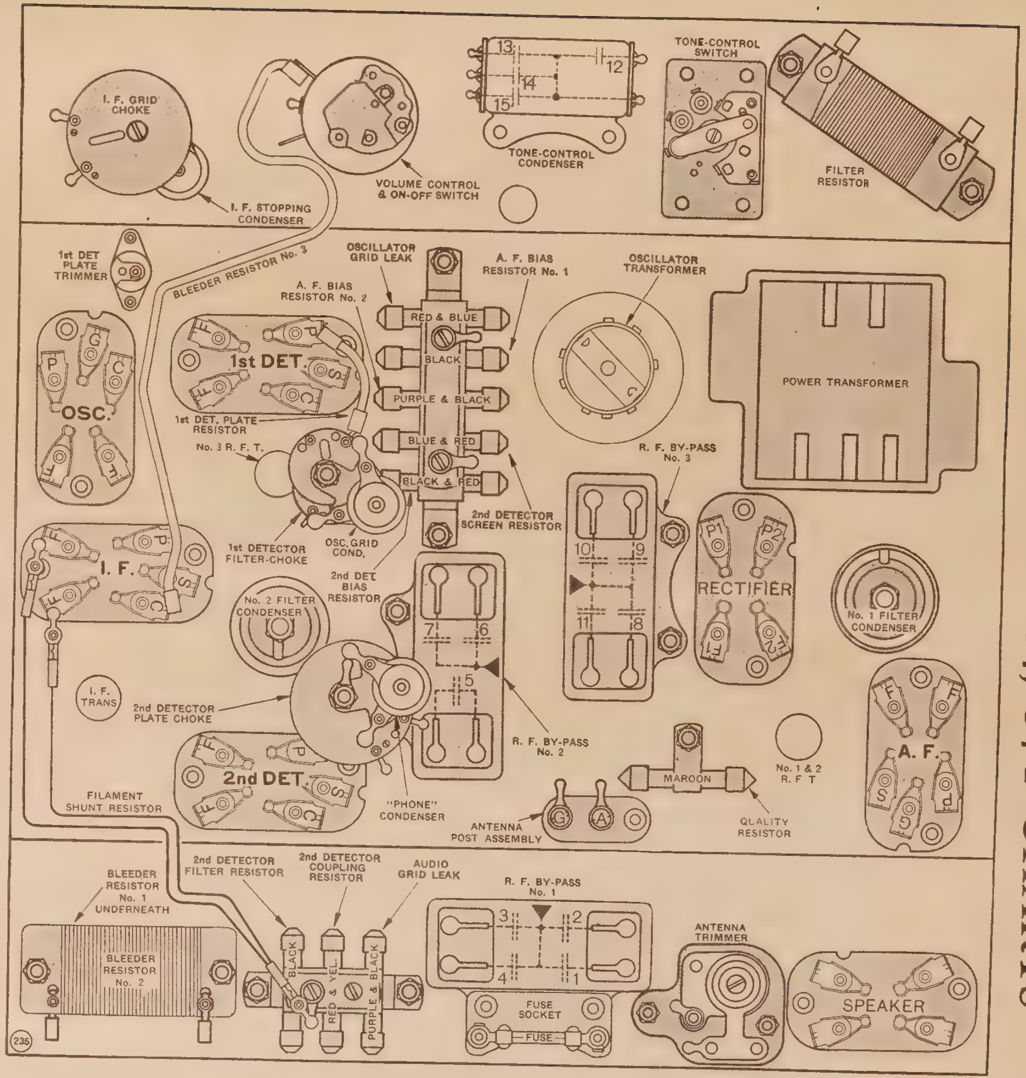

I. F. GRID CHOKE
VOLUME CONTROL & ON-OFF SWITCH
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
FILTER RESISTOR
I. F. STOPPING CONDENSER
1st DET PLATE TRIMMER
BLEEDER RESISTOR No. 3
OSCILLATOR GRID LEAK
A. F. BIAS RESISTOR No. 1
A. F. BIAS RESISTOR No. 2
OSCILLATOR TRANSFORMER
POWER TRANSFORMER
RED & BLUE
BLACK
PURPLE & BLACK
BLUE & RED
BLACK & RED
OSC.
1st DET
1st DET. PLATE RESISTOR
No. 3 R. F. T.
1st DETECTOR FILTER-CHOKE
OSC. GRID COND.
2nd DET BIAS RESISTOR
2nd DETECTOR SCREEN RESISTOR
R. F. BY-PASS No. 3
RECTIFIER
No. 1 FILTER CONDENSER
I. F.
No. 2 FILTER CONDENSER
I. F. TRANS
2nd DETECTOR PLATE CHOKE
R. F. BY-PASS No. 2
No. 1 & 2 R. F T
A. F.
2nd DET.
"PHONE" CONDENSER
ANTENNA POST ASSEMBLY
MAROON
QUALITY RESISTOR
FILAMENT SHUNT RESISTOR
BLEEDER RESISTOR No. 1 UNDERNEATH
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR COUPLING RESISTOR
AUDIO GRID LEAK
R. F. BY-PASS No. 1
ANTENNA TRIMMER
BLEEDER RESISTOR No. 2
FUSE SOCKET
FUSE
SPEAKER
235

FIG. 303. CHART OF LATE-TYPE MODEL 84, 84-F.

Some late-type Model 84, 84-F receivers have slightly different oscillator transformers and connections than indicated in the diagram Fig. 288. When servicing such sets, carefully note and adhere to the original method of wiring. A flexible type 1st-detector bias resistor (not shown above) is connected from condenser 9 to condenser 3.

By-pass Condensers in Model 84, 84-F.

R. F. By-pass No. 1

1—2nd-detector filter condenser.
2—Quality condenser.
3—I. F. bias by-pass.
4—A. F. bias by-pass.

R. F. By-pass No. 2

5—2nd-detector—A. F. coupling condenser.
6—Tracking condenser.
7—2nd-detector bias by-pass.

R. F. By-pass No. 3

8—1st-detector filter condenser.
9—1st-detector bias by-pass.
10—1st-detector—I. F. screen by-pass.
11—2nd-detector screen by-pass.

Tone-control Condenser
(used only in late type)

12—Not used.
13—Tone-control condenser.
14—Not used.
15—Tone-control condenser.

MODEL 84-D TOP VIEW AND CHART

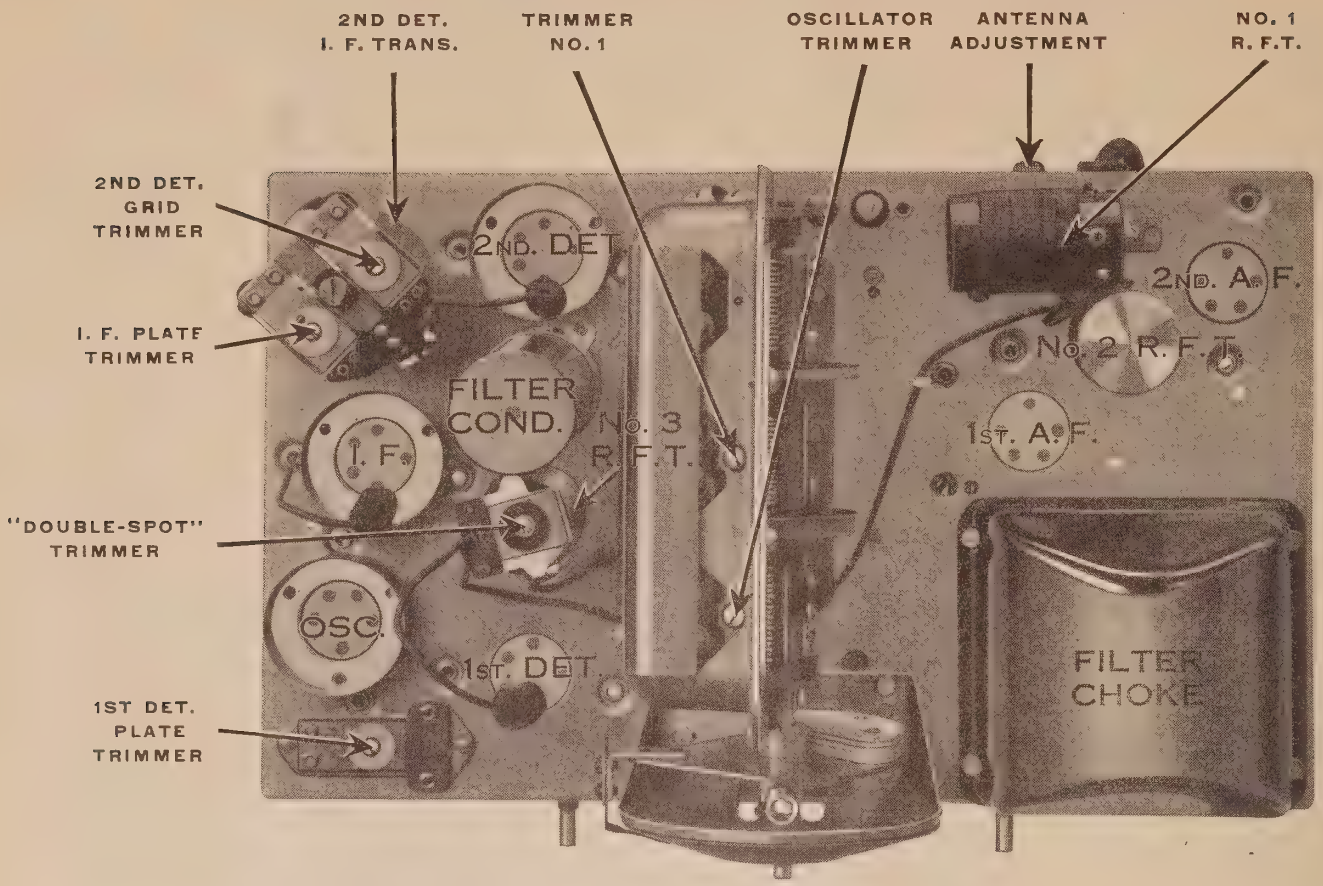

2ND DET. I. F. TRANS.
TRIMMER NO. 1
OSCILLATOR TRIMMER
ANTENNA ADJUSTMENT
NO. 1 R. F. T.
2ND DET. GRID TRIMMER
I. F. PLATE TRIMMER
"DOUBLE-SPOT" TRIMMER
1ST DET. PLATE TRIMMER
2ND. DET.
FILTER COND.
No. 3 R. F. T.
I. F.
OSC.
1ST. DET.
2ND. A. F.
No. 2 R. F. T.
1ST. A. F.
FILTER CHOKE

FIG. 304. TOP VIEW OF MODEL 84-D.

By-pass Condensers in Model 84-D

Condensers in R. F. By-pass No. 1

1—Ground coupling condenser.
2—1st-detector screen by-pass.
3—110-volt line condenser.
4—1st-detector grid by-pass.

R. F. By-pass No. 2

5—2nd-detector—1st-A. F. coupling condenser.
6—Filter condenser No. 2.
7—Tracking condenser.

R. F. By-pass No. 3

8—Quality condenser.
9—2nd-detector filter condenser.
10—2nd-A. F. grid condenser in early-type sets, 2nd-detector phone condenser in later-type sets.

Tone-control Condenser (Late-type sets only)

11—Not used.
12—Tone condenser.
13—Tone condenser.
14—Tone condenser.

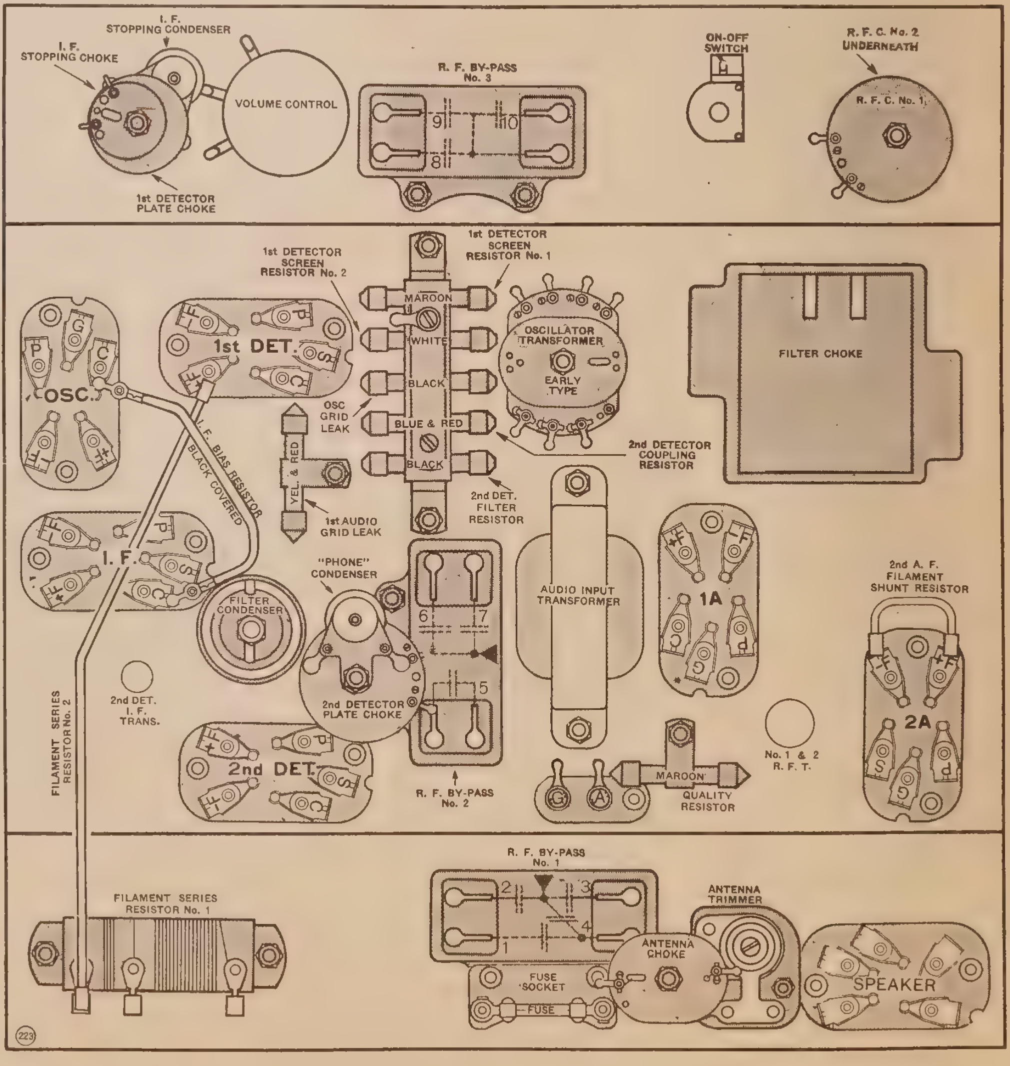

I. F. STOPPING CONDENSER
I. F. STOPPING CHOKE
VOLUME CONTROL
1st DETECTOR PLATE CHOKE
R. F. BY-PASS No. 3
9
10
8
ON-OFF SWITCH
R. F. C. No. 2 UNDERNEATH
R. F. C. No. 1
1st DETECTOR SCREEN RESISTOR No. 2
1st DETECTOR SCREEN RESISTOR No. 1
MAROON
WHITE
BLACK
BLUE & RED
BLACK
OSC GRID LEAK
YEL. & RED
1st AUDIO GRID LEAK
OSCILLATOR TRANSFORMER
EARLY TYPE
2nd DETECTOR COUPLING RESISTOR
2nd DET. FILTER RESISTOR
FILTER CHOKE
OSC.
1st DET.
I. F. BIAS RESISTOR
BLACK COVERED
I. F.
FILTER CONDENSER
"PHONE" CONDENSER
6
7
5
2nd DETECTOR PLATE CHOKE
AUDIO INPUT TRANSFORMER
1A
2nd A. F. FILAMENT SHUNT RESISTOR
2A
2nd DET. I. F. TRANS.
FILAMENT SERIES RESISTOR No. 2
2nd DET.
R. F. BY-PASS No. 2
G
A
MAROON
QUALITY RESISTOR
No. 1 & 2 R. F. T.
R. F. BY-PASS No. 1
1
2
3
4
FILAMENT SERIES RESISTOR No. 1
ANTENNA TRIMMER
ANTENNA CHOKE
FUSE SOCKET
FUSE
SPEAKER
P
G
C
S
+F
-F
223

FIG. 305. CHART OF MODEL 84-D. (EARLY TYPE WITHOUT TONE CONTROL.)

MODEL 84-Q TOP VIEW AND CHART

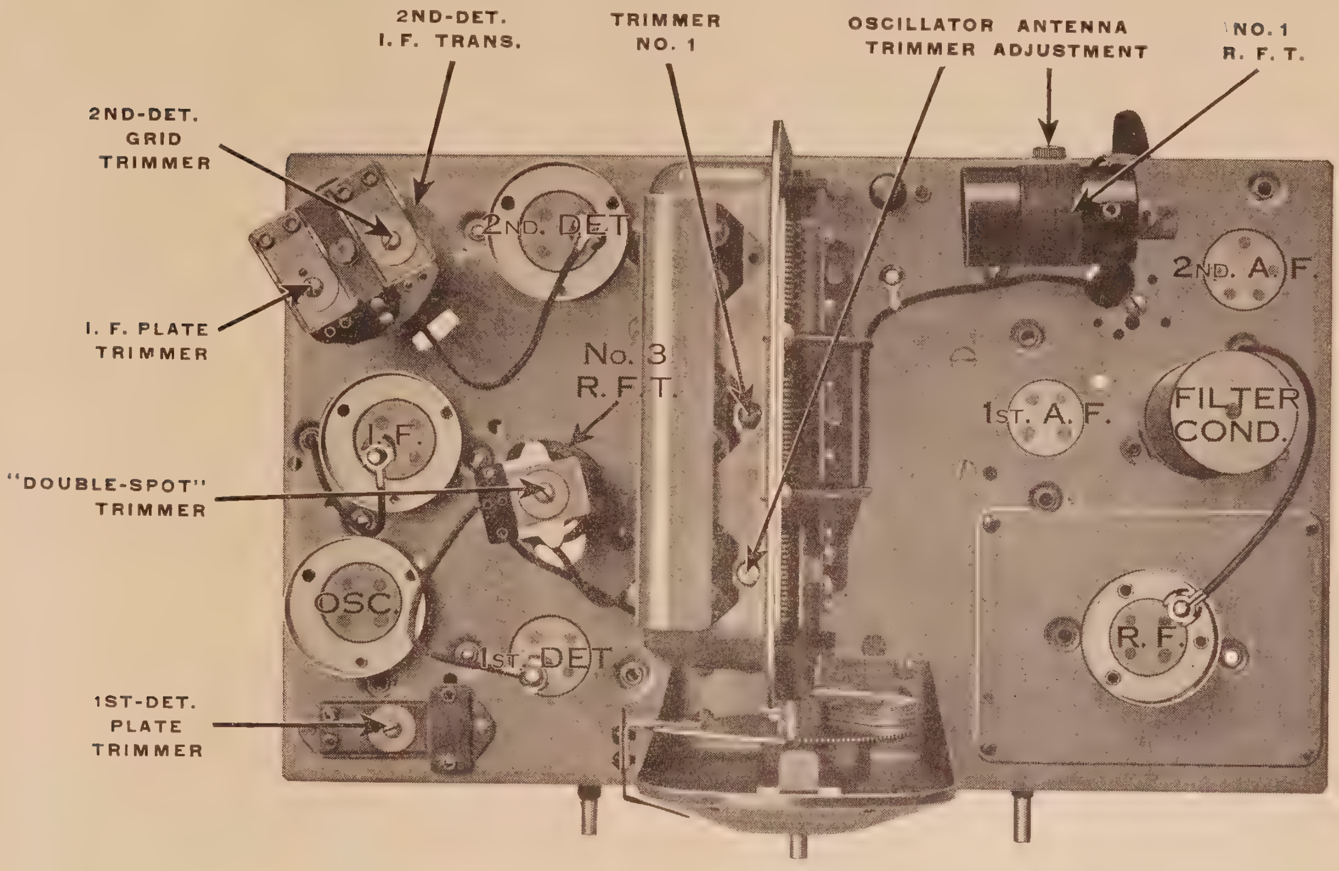

2ND-DET.
I. F. TRANS.
TRIMMER
NO. 1
OSCILLATOR
TRIMMER
ANTENNA
ADJUSTMENT
NO. 1
R. F. T.
2ND-DET.
GRID
TRIMMER
2ND. DET
2ND. A. F.
I. F. PLATE
TRIMMER
No. 3
R. F. T.
1ST. A. F.
FILTER
COND.
I. F.
"DOUBLE-SPOT"
TRIMMER
OSC.
1ST. DET.
R. F.
1ST-DET.
PLATE
TRIMMER

FIG. 306. TOP VIEW OF MODEL 84-Q.

In a few early-model 84-Q receivers, the position of the R. F. and the 1st-A. F. socket is interchanged.

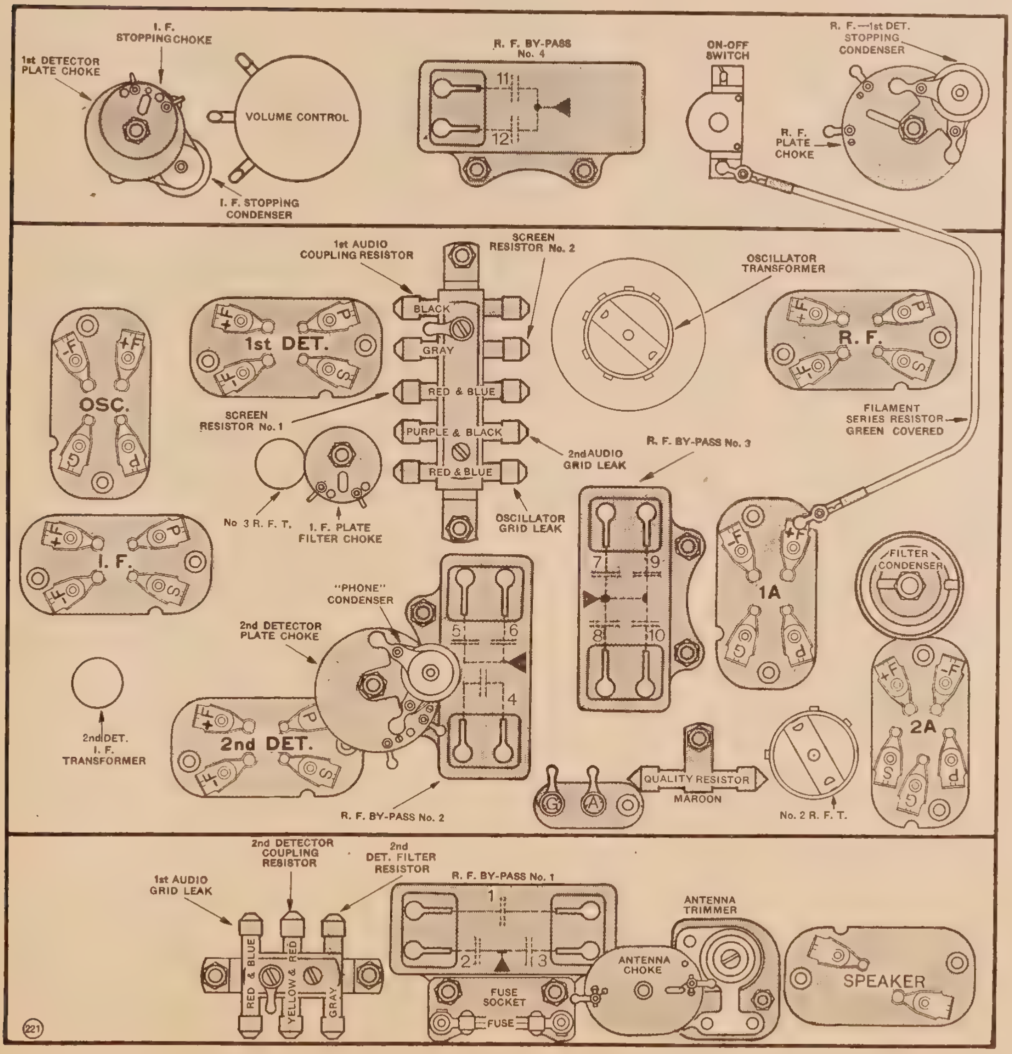

I. F.
STOPPING CHOKE
1st DETECTOR
PLATE CHOKE
VOLUME CONTROL
I. F. STOPPING
CONDENSER
R. F. BY-PASS
No. 4
11
12
ON-OFF
SWITCH
R. F.—1st DET.
STOPPING
CONDENSER
R. F.
PLATE
CHOKE
1st AUDIO
COUPLING RESISTOR
SCREEN
RESISTOR No. 2
OSCILLATOR
TRANSFORMER
1st DET.
OSC.
R. F.
BLACK
GRAY
RED & BLUE
PURPLE & BLACK
RED & BLUE
SCREEN
RESISTOR No. 1
2nd AUDIO
GRID LEAK
FILAMENT
SERIES RESISTOR
GREEN COVERED
R. F. BY-PASS No. 3
No 3 R. F. T.
I. F. PLATE
FILTER CHOKE
OSCILLATOR
GRID LEAK
I. F.
"PHONE"
CONDENSER
2nd DETECTOR
PLATE CHOKE
5
6
4
7
9
8
10
1A
FILTER
CONDENSER
2nd DET.
I. F.
TRANSFORMER
2nd DET.
2A
QUALITY RESISTOR
MAROON
G
A
R. F. BY-PASS No. 2
No. 2 R. F. T.
1st AUDIO
GRID LEAK
2nd DETECTOR
COUPLING
RESISTOR
2nd
DET. FILTER
RESISTOR
R. F. BY-PASS No. 1
1
2
3
RED & BLUE
YELLOW & RED
GRAY
ANTENNA
TRIMMER
ANTENNA
CHOKE
FUSE
SOCKET
FUSE
SPEAKER
221

FIG. 307. CHART OF MODEL 84-Q. (EARLY TYPE WITHOUT TONE CONTROL.)

By-pass Condensers in Model 84-Q

R. F. By-pass No. 1

1—1st-2nd A. F. coupling condenser.
2—Phone condenser.
3—Quality condenser.

R. F. By-pass No. 2

4—2nd-detector—1st-A. F. coupling condenser.
5—2nd-detector filter condenser.
6—Tracking condenser.

R. F. By-pass No. 3

7—R. F.-I. F. screen by-pass.
8—I. F. plate filter condenser.
9—1st-detector—2nd-detector screen by-pass.
10—+B filter condenser.

R. F. By-pass No. 4 (Later 84-Q only)

11—R. F. filament by-pass.
12—R. F. filament by-pass.

MODEL 85, 85-F TOP VIEW AND CHART

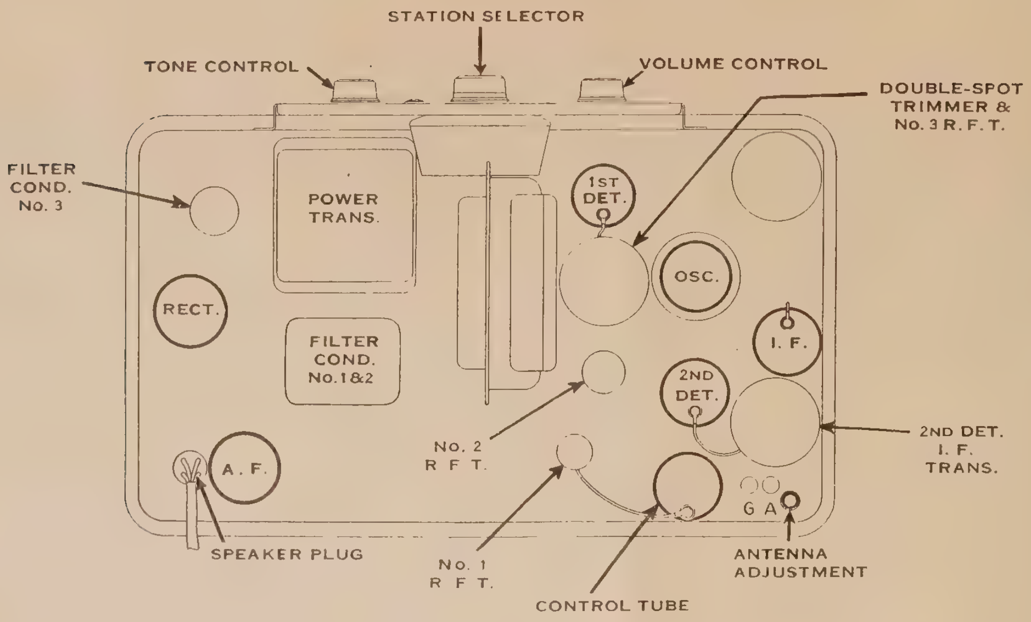

STATION SELECTOR
TONE CONTROL
VOLUME CONTROL
DOUBLE-SPOT TRIMMER & No. 3 R. F. T.
FILTER COND. No. 3
POWER TRANS.
1ST DET.
OSC.
RECT.
FILTER COND. No. 1 & 2
I. F.
2ND DET.
2ND DET. I. F. TRANS.
No. 2 R F T.
A. F.
SPEAKER PLUG
No. 1 R F T.
G A
ANTENNA ADJUSTMENT
CONTROL TUBE

FIG. 308. TOP VIEW OF MODEL 85, 85-F.

The circle in the top right corner represents the shield for the coupling unit between the 1st-detector and I. F. tubes.

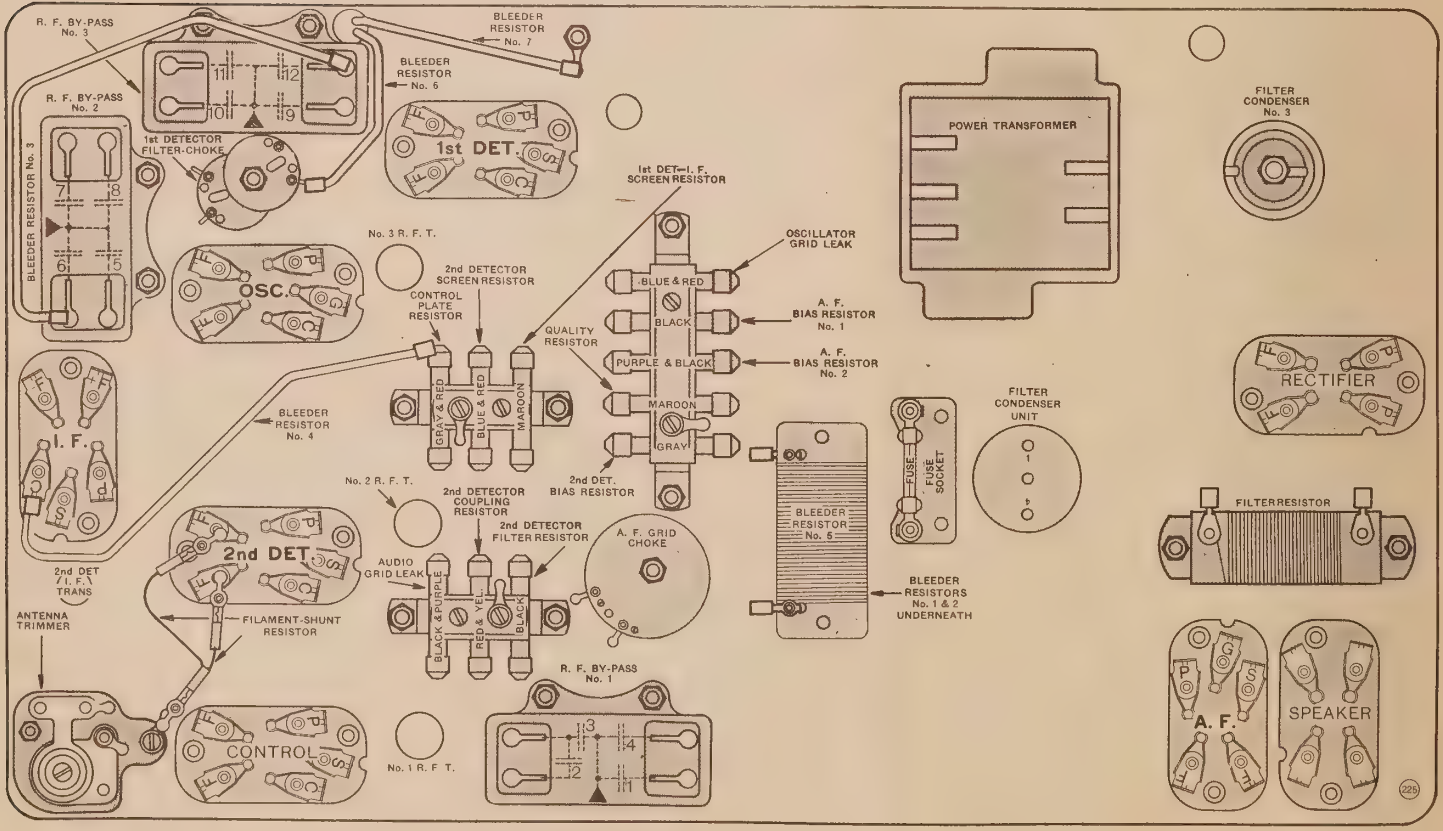

R. F. BY-PASS No. 3
11
12
10
9
BLEEDER RESISTOR No. 7
BLEEDER RESISTOR No. 6
R. F. BY-PASS No. 2
1st DETECTOR FILTER-CHOKE
1st DET.
BLEEDER RESISTOR No. 3
7
8
6
5
OSC.
No. 3 R. F. T.
1st DET—I. F. SCREEN RESISTOR
2nd DETECTOR SCREEN RESISTOR
CONTROL PLATE RESISTOR
QUALITY RESISTOR
GRAY & RED
BLUE & RED
MAROON
BLUE & RED
BLACK
PURPLE & BLACK
MAROON
GRAY
OSCILLATOR GRID LEAK
A. F. BIAS RESISTOR No. 1
A. F. BIAS RESISTOR No. 2
2nd DET. BIAS RESISTOR
POWER TRANSFORMER
FILTER CONDENSER No. 3
I. F.
BLEEDER RESISTOR No. 4
No. 2 R. F. T.
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
AUDIO GRID LEAK
BLACK & PURPLE
RED & YEL.
BLACK
A. F. GRID CHOKE
2nd DET.
2nd DET I. F. TRANS
ANTENNA TRIMMER
FILAMENT-SHUNT RESISTOR
BLEEDER RESISTOR No. 5
FUSE
FUSE SOCKET
FILTER CONDENSER UNIT
BLEEDER RESISTORS No. 1 & 2 UNDERNEATH
RECTIFIER
FILTER RESISTOR
R. F. BY-PASS No. 1
3
4
2
1
CONTROL
No. 1 R. F. T.
A. F.
SPEAKER
225

FIG. 309. CHART OF MODEL 85, 85-F.

The filter resistor is not used in Model 85-F.

By-pass Condensers in Model 85, 85-F

R. F. By-pass No. 1

1—Quality condenser.
2—2nd-detector—A. F. coupling condenser.
3—Phone condenser.
4—2nd-detector bias by-pass.

R. F. By-pass No. 2

5—A. F. bias by-pass.
6—I. F. bias by-pass.
7—Tracking condenser.
8—Control-plate by-pass.

R. F. By-pass No. 3

9—1st-detector—I. F. screen by-pass.
10—2nd-detector filter condenser.
11—1st-detector filter condenser
12—1st-detector bias by-pass.

Tone-control Condenser (on front panel)

Two top contacts—2nd-detector screen by-pass and oscillator plate-circuit by-pass.

Two bottom contacts—tone-control condensers.

MODEL 85-Q TOP VIEW AND CHART

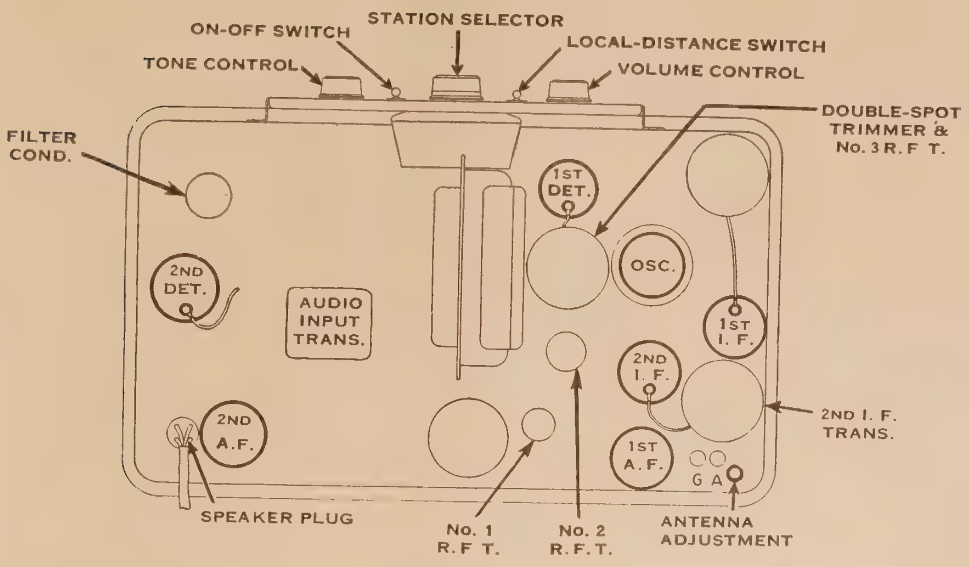

ON-OFF SWITCH
STATION SELECTOR
LOCAL-DISTANCE SWITCH
TONE CONTROL
VOLUME CONTROL
DOUBLE-SPOT TRIMMER & No. 3 R. F. T.
FILTER COND.
1ST DET.
OSC.
2ND DET.
AUDIO INPUT TRANS.
1ST I. F.
2ND I. F.
2ND I. F. TRANS.
2ND A.F.
1ST A. F.
G A
SPEAKER PLUG
No. 1 R. F T.
No. 2 R. F. T.
ANTENNA ADJUSTMENT

Fig. 310. Top View of Model 85-Q.

The circle in the top right corner indicates the shield for the coupling unit between the 1st-detector and the 1st-I. F. tubes. The circle in the bottom center is the shield covering the coupling unit between the 2nd-I. F. and the 2nd-detector tubes.

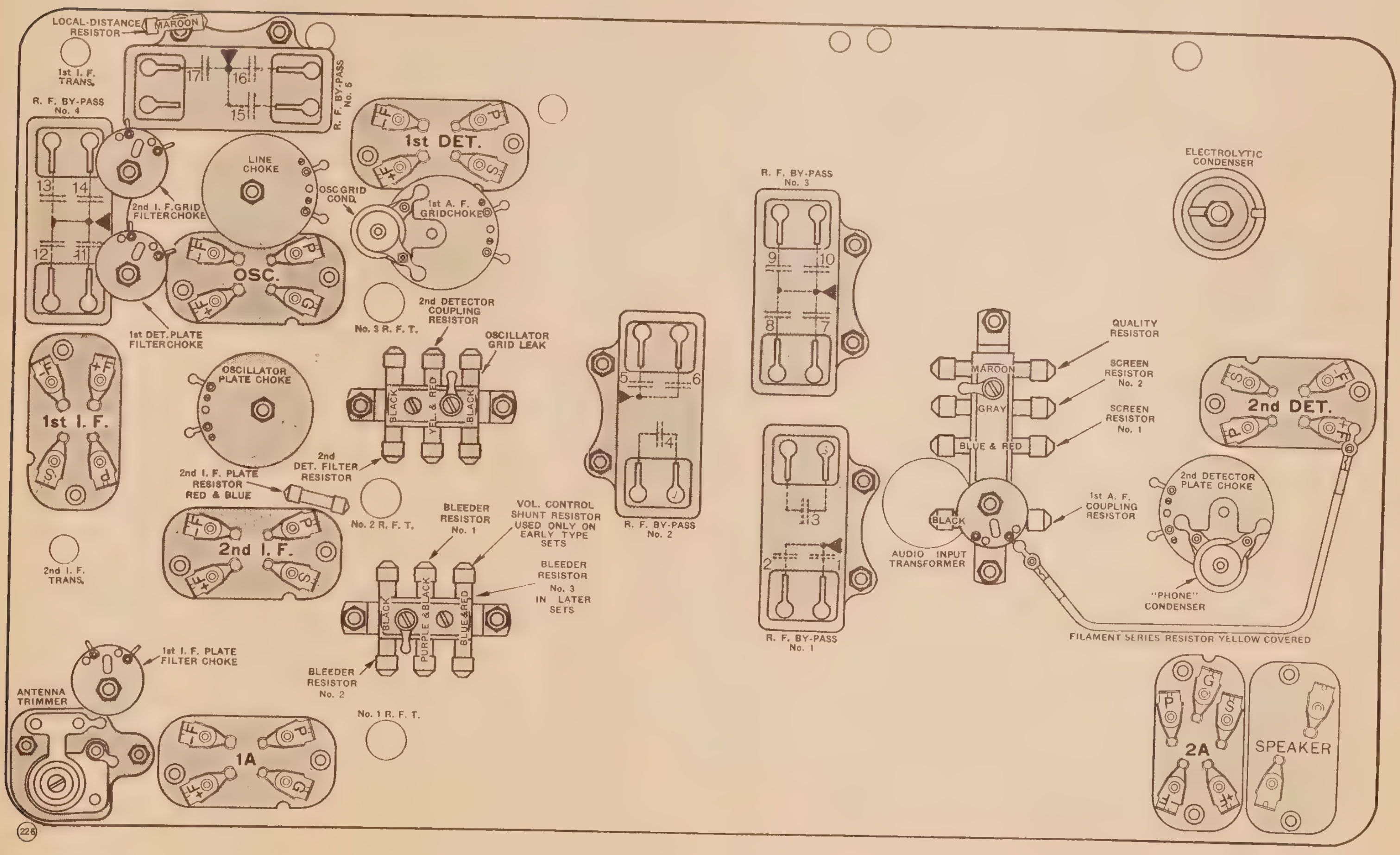

LOCAL-DISTANCE RESISTOR
MAROON
1st I. F. TRANS.
R. F. BY-PASS No. 4
17
16
15
R. F. BY-PASS No. 5
1st DET.
13
14
12
11
2nd I. F. GRID FILTERCHOKE
LINE CHOKE
OSC GRID COND.
1st A. F. GRIDCHOKE
OSC.
1st DET. PLATE FILTERCHOKE
No. 3 R. F. T.
2nd DETECTOR COUPLING RESISTOR
OSCILLATOR GRID LEAK
BLACK
YEL. & RED
BLACK
1st I. F.
OSCILLATOR PLATE CHOKE
2nd DET. FILTER RESISTOR
2nd I. F. PLATE RESISTOR RED & BLUE
No. 2 R. F. T.
BLEEDER RESISTOR No. 1
VOL. CONTROL SHUNT RESISTOR USED ONLY ON EARLY TYPE SETS
BLEEDER RESISTOR No. 3 IN LATER SETS
2nd I. F.
2nd I. F. TRANS.
BLACK
PURPLE & BLACK
BLUE & RED
BLEEDER RESISTOR No. 2
1st I. F. PLATE FILTER CHOKE
ANTENNA TRIMMER
1A
No. 1 R. F. T.
R. F. BY-PASS No. 3
9
10
8
7
5
6
4
R. F. BY-PASS No. 2
3
2
1
R. F. BY-PASS No. 1
ELECTROLYTIC CONDENSER
QUALITY RESISTOR
SCREEN RESISTOR No. 2
SCREEN RESISTOR No. 1
MAROON
GRAY
BLUE & RED
BLACK
2nd DET.
AUDIO INPUT TRANSFORMER
1st A. F. COUPLING RESISTOR
2nd DETECTOR PLATE CHOKE
"PHONE" CONDENSER
FILAMENT SERIES RESISTOR YELLOW COVERED
2A
SPEAKER
226

Fig. 311. Chart of Model 85-Q.

By-pass Condensers in Model 85-Q.

R. F. By-pass No. 1

1—1st-detector grid-circuit by-pass.
2—Quality condenser.
3—Not used.

R. F. By-pass No. 2

4—2nd-detector—1st-A. F. coupling condenser.
5—1st-A. F. grid filter condenser.
6—Tracking condenser.

R. F. By-pass No. 3

7—2nd-detector grid filter condenser.
8—2nd-detector screen by-pass.
9—2nd-detector filter condenser.
10—1st-A. F. plate filter condenser.

R. F. By-pass No. 4

11—1st-I. F. plate filter condenser.
12—I. F. screen by-pass.
13—2nd-I. F. grid-circuit by-pass.
14—1st-I. F. grid-circuit by-pass.

R. F. By-pass No. 5

15—1st-detector screen by-pass.
16—1st-I. F. grid-circuit by-pass.
17—1st-detector plate filter condenser.

MODEL 86, 86-F TOP VIEW AND CHART

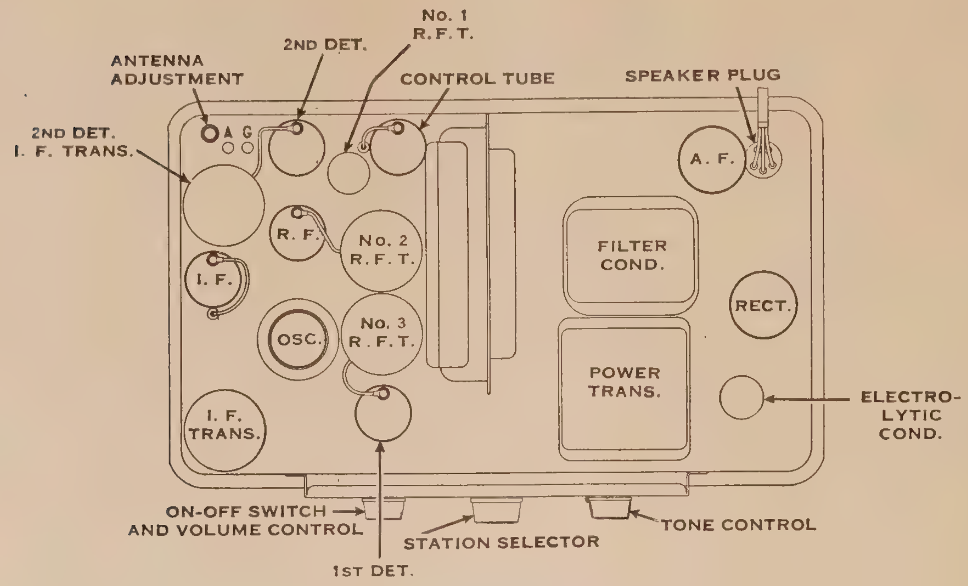

No. 1 R.F.T.
2ND DET.
ANTENNA ADJUSTMENT
CONTROL TUBE
SPEAKER PLUG
2ND DET. I. F. TRANS.
A G
A. F.
R. F.
No. 2 R. F. T.
I. F.
FILTER COND.
RECT.
OSC.
No. 3 R. F. T.
POWER TRANS.
I. F. TRANS.
ELECTRO-LYTIC COND.
ON-OFF SWITCH AND VOLUME CONTROL
STATION SELECTOR
TONE CONTROL
1ST DET.

FIG. 312. TOP VIEW OF MODEL 86, 86-F.

The speaker plug has only four prongs instead of five, as indicated above.

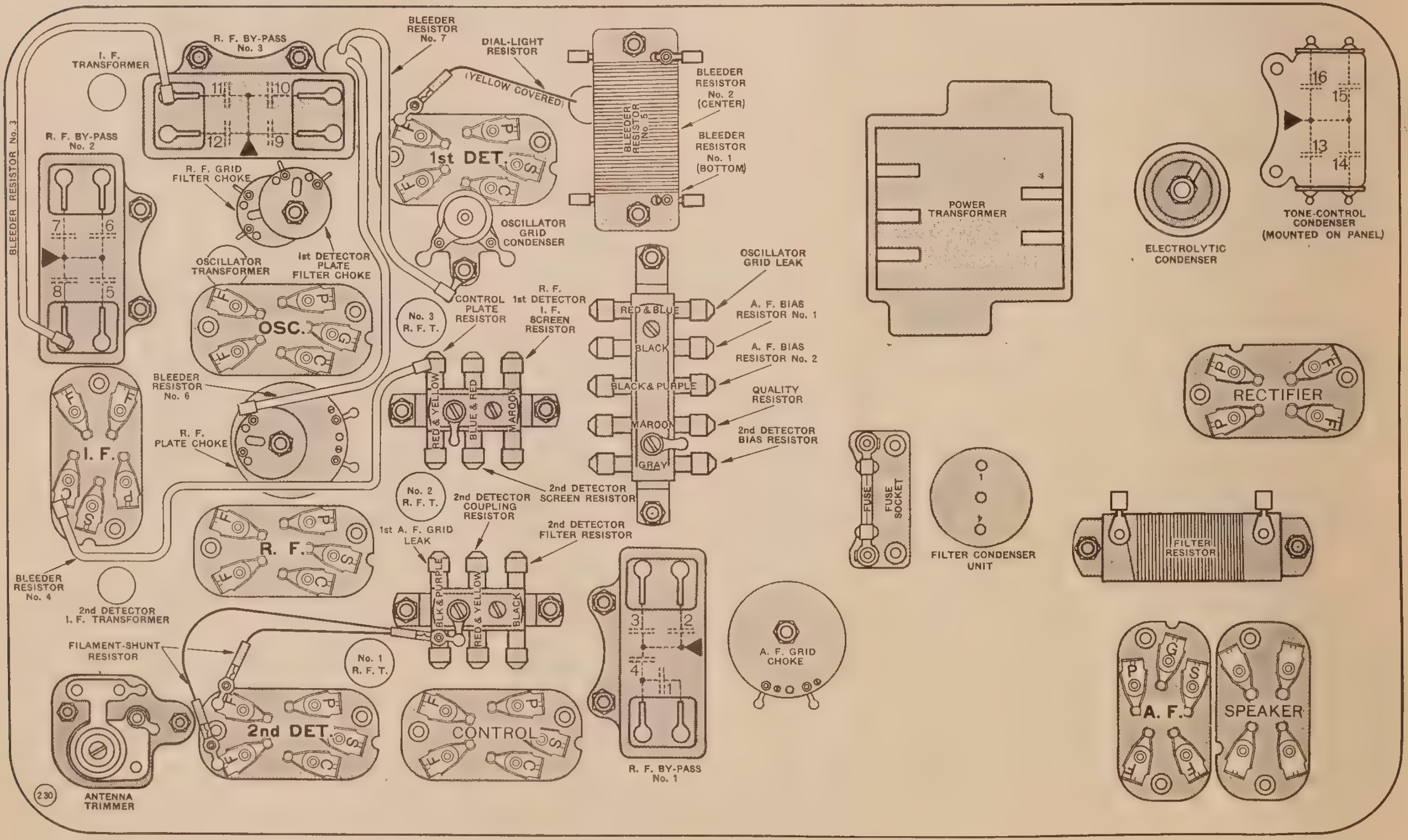

BLEEDER RESISTOR No. 7
DIAL-LIGHT RESISTOR
(YELLOW COVERED)
R. F. BY-PASS No. 3
I. F. TRANSFORMER
11
10
12
9
BLEEDER RESISTOR No. 3
R. F. BY-PASS No. 2
7
6
8
5
R. F. GRID FILTER CHOKE
1st DET.
BLEEDER RESISTOR No. 5
BLEEDER RESISTOR No. 2 (CENTER)
BLEEDER RESISTOR No. 1 (BOTTOM)
POWER TRANSFORMER
16
15
13
14
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
ELECTROLYTIC CONDENSER
OSCILLATOR GRID CONDENSER
OSCILLATOR TRANSFORMER
1st DETECTOR PLATE FILTER CHOKE
OSC.
OSCILLATOR GRID LEAK
No. 3 R. F. T.
CONTROL PLATE RESISTOR
R. F. 1st DETECTOR I. F. SCREEN RESISTOR
RED & BLUE
A. F. BIAS RESISTOR No. 1
BLACK
A. F. BIAS RESISTOR No. 2
BLACK & PURPLE
QUALITY RESISTOR
MAROON
2nd DETECTOR BIAS RESISTOR
GRAY
RECTIFIER
BLEEDER RESISTOR No. 6
RED & YELLOW
BLUE & RED
MAROON
R. F. PLATE CHOKE
I. F.
No. 2 R. F. T.
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR SCREEN RESISTOR
2nd DETECTOR FILTER RESISTOR
1st A. F. GRID LEAK
R. F.
FUSE
FUSE SOCKET
FILTER CONDENSER UNIT
FILTER RESISTOR
BLEEDER RESISTOR No. 4
2nd DETECTOR I. F. TRANSFORMER
BLK & PURPLE
RED & YELLOW
BLACK
3
2
4
1
A. F. GRID CHOKE
FILAMENT-SHUNT RESISTOR
No. 1 R. F. T.
A. F.
SPEAKER
2nd DET.
CONTROL
230
ANTENNA TRIMMER
R. F. BY-PASS No. 1

FIG. 313. CHART OF MODEL 86, 86-F.

The filter resistor is not used in Model 86-F.

By-pass Condensers in Model 86, 86-F

R. F. By-pass No. 1

1—2nd-detector—A. F. coupling condenser.
2—Quality condenser.
3—2nd-detector bias by-pass.
4—Phone condenser.

R. F. By-pass No. 2

5—A. F. bias by-pass.
6—R. F. grid filter condenser.
7—Control plate by-pass.
8—R. F.—I. F. bias by-pass.

R. F. By-pass No. 3

9—1st-detector plate filter condenser.
10—R. F.-1st-detector—I. F. screen by-pass.
11—1st-detector bias by-pass.
12—2nd-detector filter condenser.

Tone-control Condenser

13—Tone-control condenser.
14—Tone-control condenser.
15—2nd-detector screen by-pass.
16—2nd-detector screen by-pass.

MODEL 87 TOP VIEW AND CHART

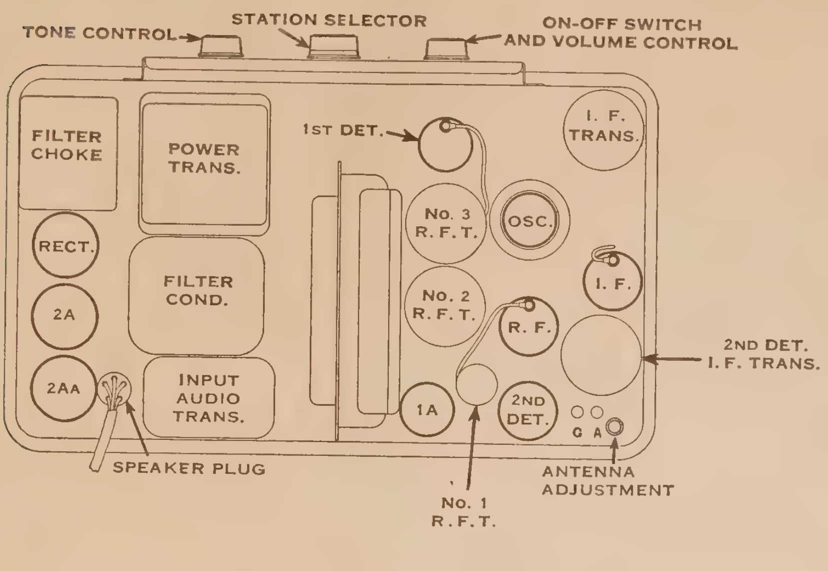

TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH AND VOLUME CONTROL
FILTER CHOKE
POWER TRANS.
1ST DET.
I. F. TRANS.
No. 3 R. F. T.
OSC.
RECT.
FILTER COND.
No. 2 R. F. T.
I. F.
R. F.
2A
2ND DET. I. F. TRANS.
2AA
INPUT AUDIO TRANS.
1A
2ND DET.
G A
SPEAKER PLUG
ANTENNA ADJUSTMENT
No. 1 R. F. T.

Fig. 314. Top View of Model 87.

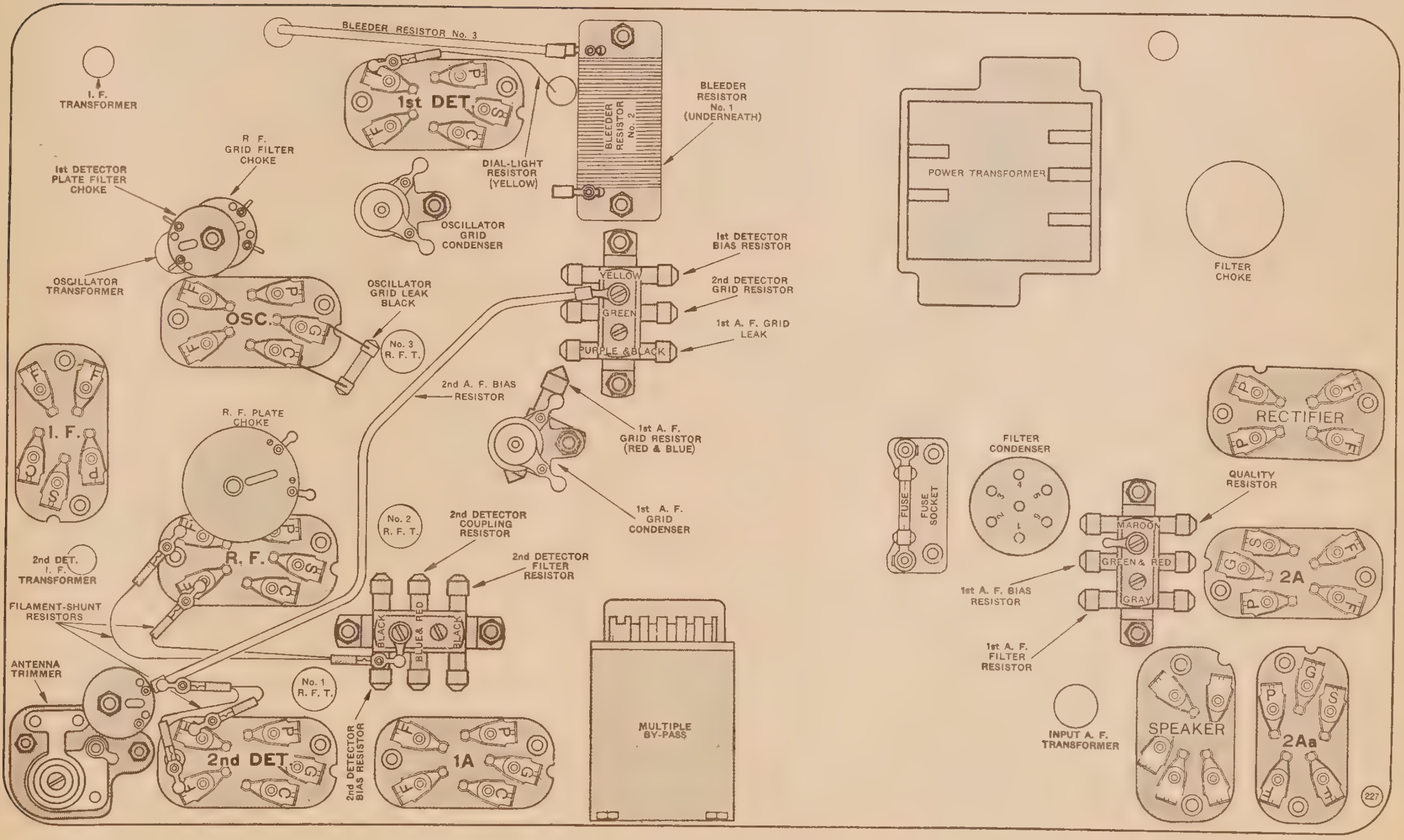

BLEEDER RESISTOR No. 3
I. F. TRANSFORMER
1st DET.
P
S
C
F
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1 (UNDERNEATH)
R F. GRID FILTER CHOKE
1st DETECTOR PLATE FILTER CHOKE
DIAL-LIGHT RESISTOR (YELLOW)
OSCILLATOR GRID CONDENSER
POWER TRANSFORMER
FILTER CHOKE
1st DETECTOR BIAS RESISTOR
YELLOW
2nd DETECTOR GRID RESISTOR
GREEN
1st A. F. GRID LEAK
PURPLE & BLACK
OSCILLATOR TRANSFORMER
OSC.
G
OSCILLATOR GRID LEAK BLACK
No. 3 R. F. T.
2nd A. F. BIAS RESISTOR
I. F.
R. F. PLATE CHOKE
1st A. F. GRID RESISTOR (RED & BLUE)
1st A. F. GRID CONDENSER
RECTIFIER
FILTER CONDENSER
FUSE
FUSE SOCKET
QUALITY RESISTOR
MAROON
GREEN & RED
GRAY
2A
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
No. 2 R. F. T.
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
2nd DET. I. F. TRANSFORMER
R. F.
FILAMENT-SHUNT RESISTORS
BLACK
BLUE & RED
BLACK
ANTENNA TRIMMER
No. 1 R. F. T.
2nd DETECTOR BIAS RESISTOR
2nd DET.
1A
MULTIPLE BY-PASS
INPUT A. F. TRANSFORMER
SPEAKER
2Aa
227

Fig. 315. Chart of Model 87.

Condensers in Multiple By-pass Model 87

The internal connections of the multiple by-pass are shown on page 292.

1—1st-detector plate filter condenser.
2—1st-detector bias by-pass.
3—R. F.—I. F. bias by-pass.
4—2nd-detector grid-circuit by-pass.
5—2nd-detector—1st-A. F. coupling condenser.
6—Phone condenser.
7—R. F. grid filter condenser.
8—Quality condenser.
9—2nd-detector bias by-pass.
10—2nd-detector filter condenser.
11—R. F.—1st-detector—I. F. screen by-pass.

MODEL 89, 89-F TOP VIEW AND CHART

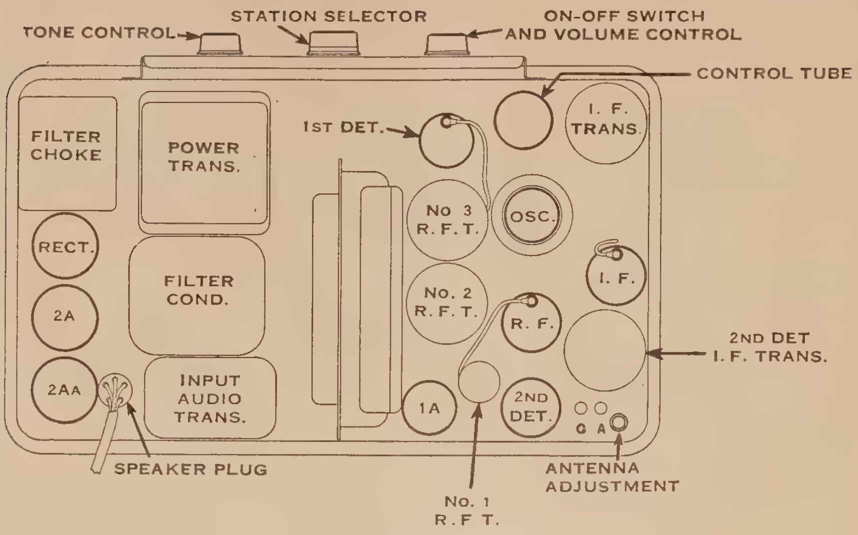

TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH AND VOLUME CONTROL
CONTROL TUBE
FILTER CHOKE
POWER TRANS.
1ST DET.
I. F. TRANS.
No 3 R. F. T.
OSC.
RECT.
FILTER COND.
I. F.
2A
No. 2 R. F. T.
R. F.
2ND DET I. F. TRANS.
2AA
INPUT AUDIO TRANS.
1A
2ND DET.
G A
SPEAKER PLUG
ANTENNA ADJUSTMENT
No. 1 R. F T.

Fig. 316. Top View of Model 89, 89-F.

Model 89-P has two binding posts for pick-up connection at the rear of the chassis, and a radio-phono toggle switch is mounted on the front panel.

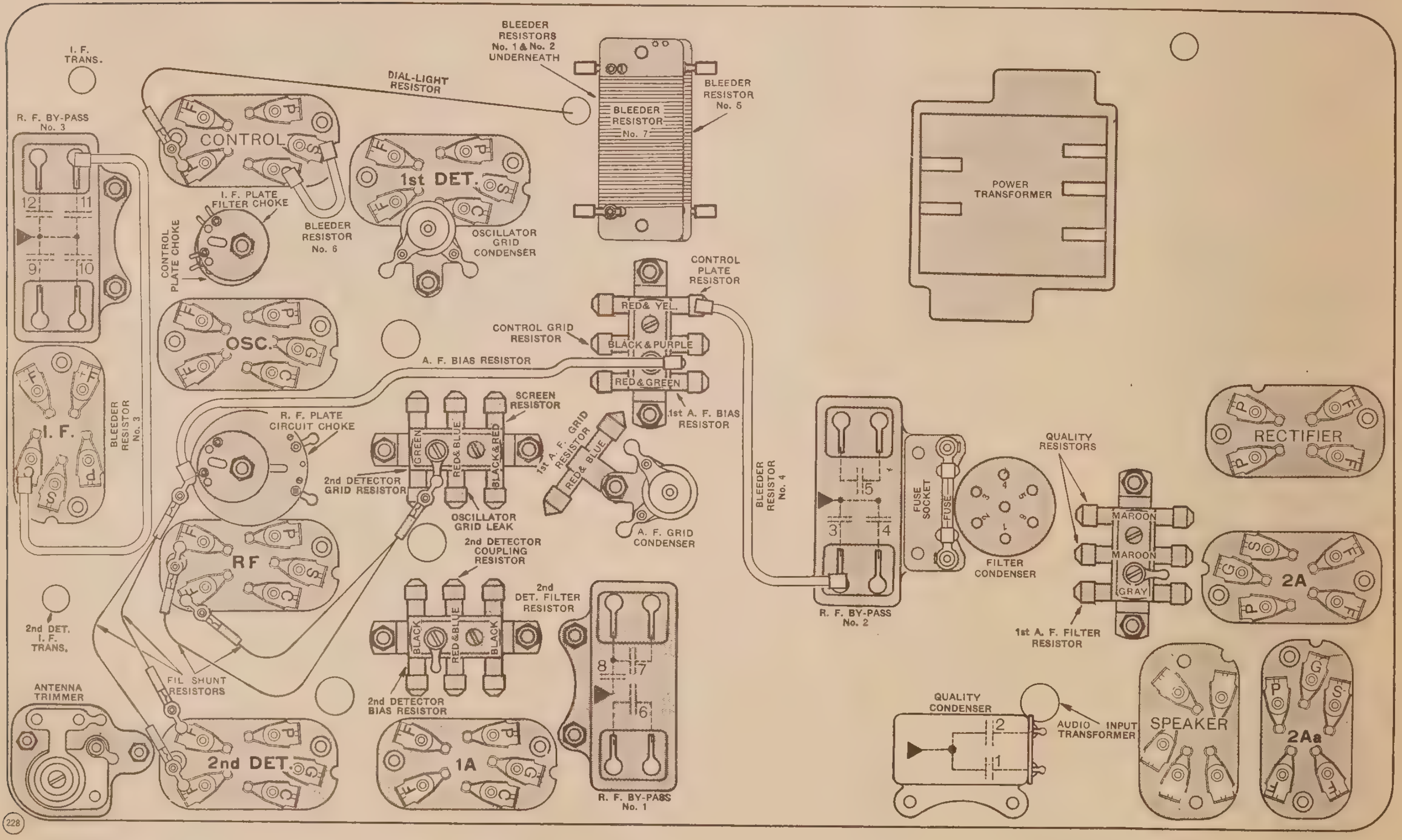

I. F. TRANS.
BLEEDER RESISTORS No. 1 & No. 2 UNDERNEATH
DIAL-LIGHT RESISTOR
BLEEDER RESISTOR No. 7
BLEEDER RESISTOR No. 5
R. F. BY-PASS No. 3
CONTROL
F P S G F
1st DET.
12 11 9 10
I. F. PLATE FILTER CHOKE
CONTROL PLATE CHOKE
BLEEDER RESISTOR No. 6
OSCILLATOR GRID CONDENSER
POWER TRANSFORMER
CONTROL PLATE RESISTOR
RED& YEL.
CONTROL GRID RESISTOR
BLACK & PURPLE
OSC.
A. F. BIAS RESISTOR
RED & GREEN
1st A. F. BIAS RESISTOR
SCREEN RESISTOR
GREEN
RED& BLUE
BLACK & RED
1st A. F. GRID RESISTOR
RED& BLUE
I. F.
BLEEDER RESISTOR No. 3
R. F. PLATE CIRCUIT CHOKE
2nd DETECTOR GRID RESISTOR
OSCILLATOR GRID LEAK
A. F. GRID CONDENSER
BLEEDER RESISTOR No. 4
FUSE SOCKET
FUSE
5 3 4
FILTER CONDENSER
QUALITY RESISTORS
MAROON
MAROON
GRAY
RECTIFIER
2A
R. F. BY-PASS No. 2
1st A. F. FILTER RESISTOR
RF
2nd DETECTOR COUPLING RESISTOR
2nd DET. FILTER RESISTOR
BLACK
RED&BLUE
BLACK
2nd DET. I. F. TRANS.
8 7 6
FIL SHUNT RESISTORS
ANTENNA TRIMMER
2nd DETECTOR BIAS RESISTOR
QUALITY CONDENSER
2 1
AUDIO INPUT TRANSFORMER
SPEAKER
2Aa
2nd DET.
1A
R. F. BY-PASS No. 1
228

Fig. 317. Chart of Model 89, 89-F.

The 2nd-detector grid resistor is not used in late-type Model 89, 89-F, 89-P.

By-pass Condensers in Model 89, 89-F, 89-P

Quality Condenser

1—Quality condenser.
2—Quality condenser.

R. F. By-pass No. 1

6—2nd-detector—1st-A. F. coupling condenser.
7—2nd-detector grid-circuit by-pass.
8—2nd-detector bias by-pass.

(A small "phone" condenser, not shown, is connected internally to the lower-left terminal of by-pass No. 1.)

R. F. By-pass No. 2

3—R. F. bias-by-pass.
4—2nd-detector filter condenser.
5—I. F. screen by-pass.

R. F. By-pass No. 3

9—I. F. plate by-pass.
10—1st-detector grid-circuit by-pass.
11—1st-detector bias by-pass.
12—Control-plate condenser.

ILLUSTRATIONS OF SPEAKERS IN A. C.- AND BATTERY-OPERATED COMPACT MODELS

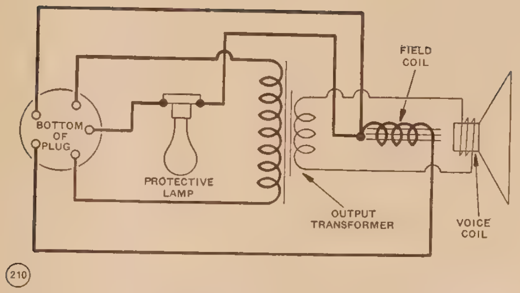

BOTTOM OF PLUG
PROTECTIVE LAMP
FIELD COIL
OUTPUT TRANSFORMER
VOICE COIL
210

FIG. 318. CIRCUIT OF SPEAKER USED IN MODEL 82-D, 84-D.

The protective lamp (75 watts) is connected in series with the electrolytic filter condenser in the chassis. If the 110-volt D. C. supply plug is reversed, the lamp will light. When the 110-volt plug is properly inserted, the lamp does not light. This action is due to the fact that the electrolytic condenser passes current if the polarity of the applied D. C. voltage is not correct.

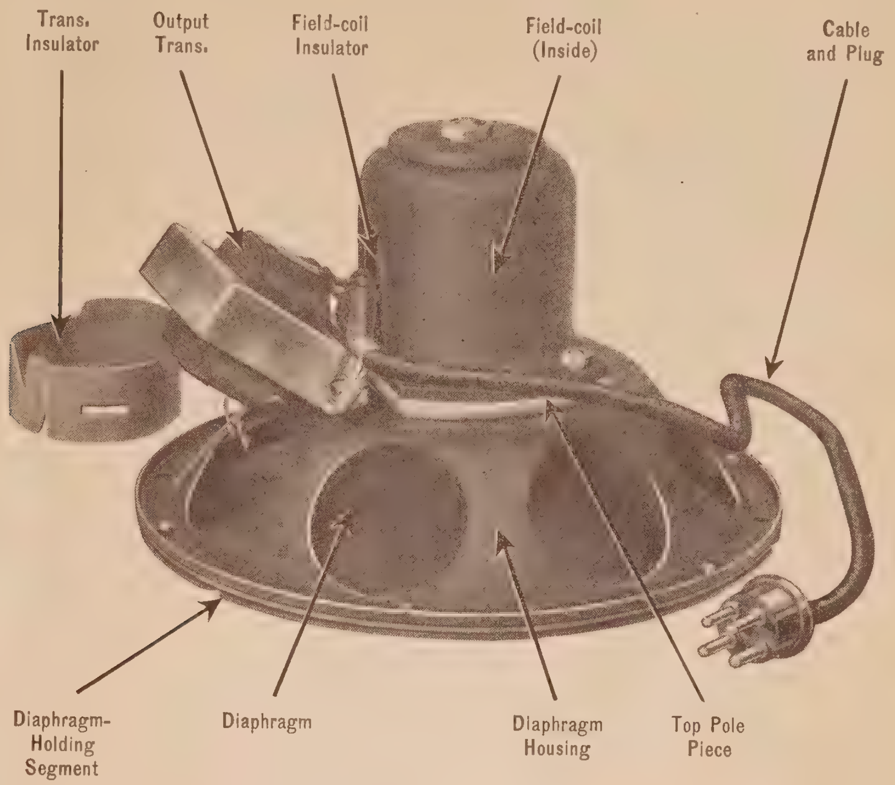

Trans. Insulator
Output Trans.
Field-coil Insulator
Field-coil (Inside)
Cable and Plug
Diaphragm-Holding Segment
Diaphragm
Diaphragm Housing
Top Pole Piece

FIG. 319. TYPE S SPEAKER USED IN MODEL 80, 80-F, 82, 82-F, 84 AND 84-F.

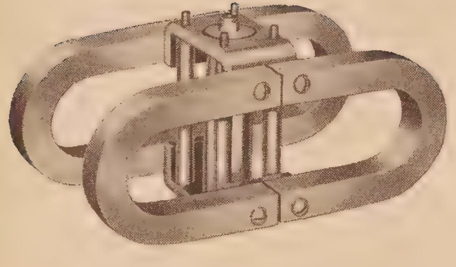


FIG. 320. No. 19918 MAGNET ASSEMBLY USED IN PERMANENT-MAGNET ELECTRO-DYNAMIC SPEAKER.

IMPORTANT.—No separate parts are furnished for the No. 19918 magnet assembly in the permanent-magnet electro-dynamic speakers. If any part of the magnet assembly requires replacement or adjustment, return the complete unit, exactly as shown, to your distributor.

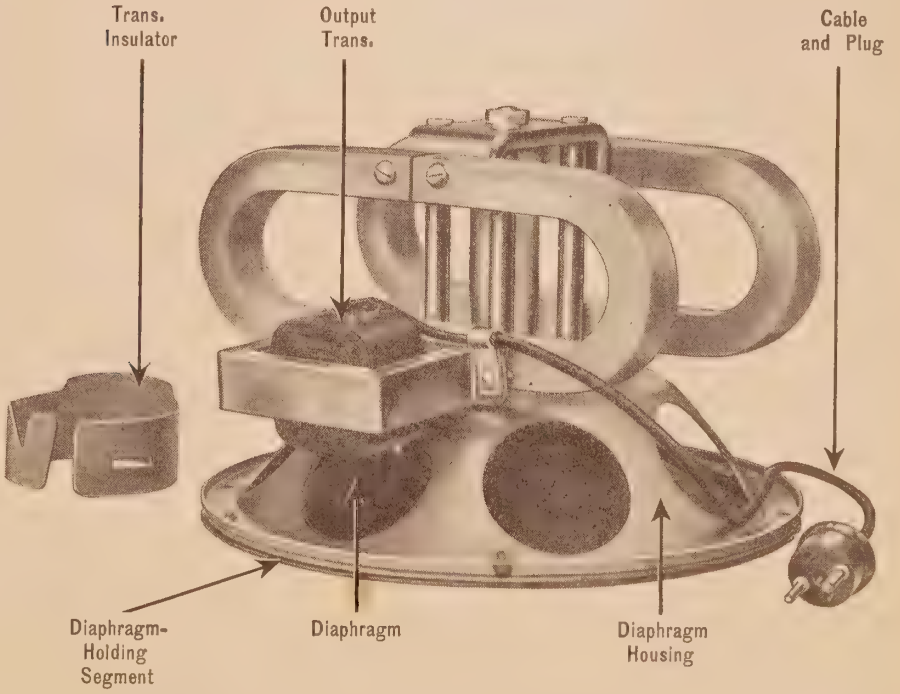

Trans. Insulator
Output Trans.
Cable and Plug
Diaphragm-Holding Segment
Diaphragm
Diaphragm Housing

FIG. 321. PERMANENT-MAGNET-TYPE ELECTRO-DYNAMIC SPEAKER USED IN BATTERY-OPERATED MODELS.

PARTS AND PRICE LIST FOR MODEL 81, No. 20300 MOTOR CAR RADIO

Part No.	*Name of Part*	*List Price*
21048	CHASSIS AND BATTERY CONTAINER (less lid)	$ 3.00
21049	Container lid	1.00
21148	Battery container cardboard Net	.25
21331	Battery top pad “	.03
21061	Mounting bolt 13″ long	.10
21142	Mounting bolt washer	.01
21141	Mounting bolt lockwasher	.70/c
21064	Wing nut	.05
21399	VARIABLE CONDENSER STATOR ROTOR & FRAME WITH LEADS	6.00
4887	Variable condenser mounting screw	.30/c
18844	Rotor connection (long)	.10
20119	Trimmer mica	.03
21126	Control pulley	.75
21583	Control pulley set screw	.05
21479	Control pulley clamp screw	.02
21582	Control pulley clamp washer	.01
21127	Control pulley spring	.55
20928	Spring centering ring	.05
19060	ELECTROLYTIC CONDENSER	2.50
19716	Clamp for electrolytic without case	.10
17068	Electrolytic clamp rivet	.01
19543	Clamp screw	.25/c
19784	Clamp nut	.01
	FIXED CONDENSERS	
23140	Multiple by-pass condenser	2.00
23250	1st R. F. grid circuit by-pass cond.	.35
21160	Phone condenser	.50
21160	Control coupling condenser	.50
	TRANSFORMERS	
21398	Antenna transformer	.60
21397	R. F. Transformer Group	3.75
21045	R. F. Transformer shield	.50
22810	Audio transformer	4.50
19623	Grid lead and cap	.12
	CHOKES	
19210	Detector plate choke	.25
19210	1st R. F. grid choke	.25
19210	Control cathode choke	.25
19210	2nd R. F. grid choke	.25
19210	1st R. F. plate filter choke	.25
	TUBULAR RESISTORS	
20950	1st R. F. screen resistor (maroon)	.25
21040	Detector grid bias resistor (black)	.25
21050	Control grid leak (blue and gray)	.25
23120	Quality resistor (red and black)	.25
23130	Control plate resistor (red and gray)	.25
	SOCKETS	
21396	Socket bracket	.35
19547	Self-tapping screw 3/8″ long	.02
21041	Tube sockets (7 used)	.35
21336	Socket (4 prongs)	.30
21337	Socket (5 prongs)	.35
17377	Socket insulator	.25/c
8249	Socket mounting rivet	.50/c
9678	Solder clip	.50/c

Part No.	*Name of Part*	*List Price*
	MODEL 81 SPEAKER NO. 22600	
21161	Diaphragm assembly	$ 2.25
19469	Diaphragm holding segment	.15
14394	Diaphragm holding segment screw	.30/c
4795	Diaphragm spider screw	.30/c
19471	Diaphragm spider washer (fibre)	.30/c
19459	Diaphragm spider washer (hex. metal)	.02
21165	Speaker housing with socket	2.00
21337	Socket (5 prongs)	.35
17377	Socket insulator	.25/c
8249	Socket rivet	.50/c
21053	Grill	1.00
19484	Cone housing	1.75
14842	Cone housing mounting screw	.01
8188	Cone housing mounting nut	.01
19475	Cardboard ring	.10
22440	Field coil	3.00
21508	Field coil insulator	.02
20147	Field coil insulating washer (front)	.05
19479	Field coil insulating washer (back)	.50/c
19454	Top pole plate	.65
19538	Pole plate mounting screw	.03
17433	Pole plate mounting lock washer	.50/c
14367	Pole plate mounting nut	.02
22830	Output transformer	3.00
19463	Output transformer strap	.10
4214	Output transformer mounting screw	.30/c
17432	Output transformer mounting lockwasher	.50/c
8188	Output transformer mounting nut	.01
21128	Speaker-to-chassis cable & plugs, 10′	4.80
15739	Cable clamp	.02
21132	Cable insulating sleeve	.05
21059	Rubber bushing	.05
21315	Cable clamp	.05
15079	Cable plug (4 prong)	.65
18582	Cable plug (5 prong)	.65
21164	Armored lead to ungrounded side of battery (5 ft. long)	.50
21162	Armored lead clamp	.05
21263	Dash rubber bushing	.10
21062	Speaker mounting bolt	.10
21141	Speaker mounting bolt lockwasher	.70/c
21142	Speaker mounting bolt washer	.01
23180	CONTROL UNIT COMPLETE SUPERSEDED BY 21492	
21492	Control unit complete	13.75
20873	Model nameplate	.05
9206	Nameplate rivet	.20/c
21323	Dial knob	.30
21478	Dial knob shaft and gear	.60
21479	Dial knob shaft screw	.02
21481	Dial knob shaft spring washer	.01
21579	Dial strip	.25
21482	Dial gear	.80
21479	Dial gear bearing screw	.02
21483	Dial gear washer	.01
21484	Station selector cable 9′ 11″ (less sheathing)	.60
21851	Station selector cable sheathing 9′	2.15
21485	Station selector cable clamping plate	.10
21486	Station selector cable clamping screw	.02

November, 1931. THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST FOR MODEL 81 (Continued)

Part No.	Name of Part	List Price
21487	Station selector cable chuck complete	$ .60
21147	Station selector cable staple	.50/c
21488	Control unit-to-speaker cable and plug (5′ 2″)	2.40
18582	Plug (5 prong)	.65
21489	Cable clamp	.05
21486	Cable clamp screw	.02
21491	Lock switch	.75
21585	Lock switch lock washer	.02
21584	Lock switch mounting nut	.10
20976	Switch key	.10
21406	Fuse 10 amp	.15
21493	Fuse socket	.35
21495	Fuse socket mounting screw	.02
21495	Dial lamp socket mounting screw	.02
21496	Volume control	1.10
21325	Volume control knob	.30
21497	Volume control mounting nut	.05
21498	Volume control fibre washer (large)	.05
21586	Volume control fibre washer (small)	.02
21050	Bleeder resistor (blue-gray)	.25
21499	Control unit base	1.00
21501	Control case	1.00
21502	Control case insulation	.10
21495	Control case mounting screw	.02
21503	Steering column clamp	.45
21504	Leather for steering column clamp	.20
21505	Steering column clamp screw	.05
17432	Steering column clamp lock washer	.50/c
21507	Steering column clamp set screw	.05
21324	Steering column cable strap	.05
21494	Dial lamp socket	.25
21407	Dial lamp	.25

MISCELLANEOUS PARTS

Part No.	Name of Part	List Price
21153	Lead to grounded side of battery 36″ long	$ .15
21151	Terminal	$ .06
23260	Generator condenser	1.25
21144	Distributor suppressor (long)	.60
21143	Plug suppressor (short)	.60
21065	Gasket for chassis & battery container	.30
21069	Shielded antenna lead	.15
21068	Antenna lead rubber bushing	.05
22530	Fibre disc (1″ diam.) with 2 lugs, used as a terminal block	.05
21149	Shipping container Net	.65
21333	Instructions “	.10
23450	PLATE ANTENNA (Complete)	4.00
21557	Antenna plate	3.25
21559	Antenna plate mounting bolt	.10
21558	Porcelain insulator	.12
21561	Wood spacing block	.01
21369	Insulating washer	.03
21562	Iron washer	.01
21141	Lock washer	.70/c
21563	Nut	.02
21442	Instruction sheet Net	.50/c
21565	Shipping container “	.20
23520	IGNITION FILTER (furnished only when defective filter is returned to distributor)	4.25
21624	Condenser for ignition filter No. 23520 (furnished only when defective condenser is returned to distributor)	2.00
23530	Choke for ignition filter	2.00

EXTRA-LENGTH CABLES

Part No.	Name of Part	List Price
21652	Station selector cable, per foot	.06
21653	Station selector cable sheathing, per ft.	.25
21654	Speaker-to-chassis cable, per foot	.35
21655	Control unit-to-speaker cable, per foot	.35
21656	Speaker-to-chassis cable (with plugs) 15 ft. long	6.55

BY-PASS AND TONE-CONTROL CONDENSERS USED IN SCREEN-GRID AND PENTODE-TYPE RECEIVERS

Part No.	*Code Markings	Type of Cond.	List Price
15262	B-1, H-1, H-9, H-20	By-pass	$1.00
15263	B-2, H-2	By-pass	.90
15640	H-16	By-pass	1.00
15770	H-15	By-pass	1.00
15780	H-17	By-pass	1.10
15790	H-18, H-21	By-pass	1.00
15837	B-3 (superseded by 16233)	By-pass	....
15870	B-7, L-28	Tone	1.00
16060	H-24, L-29 (304) Superseded by 18350	By-pass	....
16233	H-4, H-10	By-pass	.90
16461	H-6, H-12	By-pass	.75
16462	H-5, H-11	By-pass	1.00
16490	B-6, L-12	Tone	1.00
16745	H-7, H-8, H-13	By-pass	1.00
16828	B-5	Line	.50
16880	H-23, L-26 (439)	By-pass	1.10
16940	H-22, L-10	By-pass	1.10
17360	H-27, L-32	By-pass	1.10
17370	H-25, H-26, L-3, L-39	By-pass	1.10
18350	H-28, L-49	By-pass	1.10
19150	H-29	By-pass	1.00
19160	H-30	By-pass	$1.00
19560	H-31	By-pass	1.00
19690	H-32	By-pass	1.00
19710	H-33	By-pass	1.00
19980	H-34	By-pass	1.00
19990	H-35	By-pass	1.00
20010	B-8	Tone	1.00
20350	H-36	By-pass	1.00
20830	L-B-9, J-2, J-1	Multiple	2.00
21170	H-37	By-pass	1.00
21180	H-38	By-pass	1.00
21250	B-9	Tone	1.00
21430	H-39, L-37-A	By-pass	1.00
21440	H-40, L-44-A	By-pass	1.00
21450	B-10, L-36-A	Quality	.50
21530	L-42-A, B-11	Tone	1.00
22050	H-41	By-pass	1.00
22570	J-3	Multiple	2.00
23140	J-4	Multiple	2.00
23310	H-42 (superseded by 21180)**		
23330	H-43	By-pass	1.00

*For information about code markings, see Page 253 in the Service Manual.

**Do not use 23310 in place of 21180.

November, 1931. THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST

FOR MODEL 80, 82, 82-D, 82-Q, 83, 84, 84-D, 84-Q, 85, 85-Q, 86, 87 and 89

(Numbers in Circles Refer to Notes on Page 317)

NAME OF PART	Model 84, 84F Early Type①	Model 84, 84F Later Type	Model 84 D Early Type①	Model 84 D Later Type	Model 84 Q Early Type①	Model 84 Q Later Type	Model 85, 85F Early② Type①	Model 85, 85F Later Type	Model 80, 80F	Model 82, 82F	Model 82Q	Model 82D	Model 83, 83F	㉔ Model 85Q	㉕ Model 86, 86-F	Model 87	㉕ Model 89, 89F 89P
CABINET, Complete	19862 $7.60	19862 $7.60	19862 $7.60	19862 $7.60	19862 $7.60	19862 $7.60			21234 $7.60	21235 $7.60	21235 $7.60	21235 $7.60					
Cloth Screen	19691 .75	19691 .75	19691 .75	19691 .75	19691 .75	19691 .75	18959 1.00	18959 1.00	20596 .75	20601 .75	20601 .75	20601 .75	18959 $1.00	18959 $1.00	18959 $1.00	18959 $1.00	18959 $1.00
Cabinet feet	19527 .12	19527 .12	19527 .12	19527 .12	19527 .12	19527 .12			19527 .12	19527 .12	19527 .12	19527 .12					
FRONT PANEL with braces and escutcheon							21316 2.50	21317 2.50					21238 2.50	21237 2.50	21669 2.50	23280 2.50	21239③ 2.50
Front-Panel brace							17224 .10	17224 .10					17224 .10	17224 .10	17224 .10	17224 .10	17224 .10
ESCUTCHEON	19511 .65	19511 .65	19511 .65	19511 .65	19511 .65	19511 .65	18816 1.00	21438 1.00	20443 .65	19511 .65	19511 .65	19511 .65	21437 1.00	21438 1.00	21532 1.00	21439 1.00	21441 1.00
Escutcheon rivet	19552 .50/c	19552 .50/c	19552 .50/c	19552 .50/c	19552 .50/c	19552 .50/c	8272 .02	8272 .02	19552 .50/c	19552 .50/c	19552 .50/c	19552 .50/c	8272 .02	8272 .02	8272 .02	8272 .02	8272 .02
DIAL PLATE AND BRACKET ASSEMBLY	19750 .65	19750 .65	19750 .65	19750 .65	19590 .50	19590 .50	19750 .65	19750 .65	19750 .65	19750 .65	19590 .50	19750 .65	19750 .65	19590 .50			
Dial-light socket and reflector															16420A .40	16420A .40	16420A .40
Dial plate	18882 .30	18882 .30	18882 .30	18882 .30	19932 .30	19932 .30	18882 .30	18882 .30	18882 .30	18882 .30	19932 .30	18882 .30	18882 .30	19932 .30			
Dial-plate rivet	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c	15734 .30/c			
Dial lamp	19644 .25	19644 .25	16099 .25	16099 .25			19644 .25	19644 .25	19644 .25	19644 .25		16099 .25	19644 .25		19644 .25	19644 .25	19644 .25
Dial knob	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30
VOLUME CONTROL, complete less leads④	19040 2.45	20180 2.90	19040 2.45	20389⑤ 3.45	19040 2.45	19040 2.45	19040 2.45	20030⑦ 2.75	20840⑦ 2.75	20990⑦ 2.75	16122㉑ 3.00	20389⑤ 3.45	22330⑦ 2.75	16122㉑ 3.00	23410⑦ 2.75	22650⑦ 2.75	20389⑤ 3.45
Volume-control mounting bracket							19777 .20	20646 .30					20646 .30	21236 .30	20646 .30	20646 .30	20646 .30
Volume-control mounting insulation								20135 .05	20135 .05	20135 .05	20135 .05	20135 .05	20135 .05	20135 .05	20135 .05	20135 .05	20135 .05
Volume-control mounting nut	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03
TONE-CONTROL Condenser		16490 1.00		16490 1.00		16490 1.00	16490 1.00	20010 1.00		21250 1.00	16490 1.00	16490 1.00		16490 1.00	20010 1.00	21530 1.00	21530 1.00
Tone-control condenser clamp							18223 .05	18223 .05						18223 .05	18223 .05	18223 .05	18223 .05
Tone-control switch, complete		20730 .75		20730 .75		20730 .75	16430 .75	20730 .75	20730 .75	20730 .75	20730 .75	20730 .75	20730 .75	20730 .75	20730 .75	16430 .75	16430 .75
Tone-control-switch base							18148 .60									18148 .60	18148 .60
Tone-control-switch shaft							18146 .12									18146 .12	18146 .12

Tone-control-switch blade							18112 .03									18112 .03	18112 .03
ON-OFF SWITCH	19050 1.10	⑦	19050 1.10	⑥	19902 1.50	20420 1.50	19480 1.10	⑦	⑦	⑦	20420 1.50	⑥	⑦	22010 1.50	⑦	⑦	⑥
On-off switch nut	19546 .03		19546 .03														
LOCAL-DISTANCE SWITCH (Phonograph switch in 89P)											22590 1.50			13664 1.00			17461 1.00
KNOB for switch or colume control	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30	17244 .30
POWER TRANSFORMER, 60 Cycle	19070 7.50	19070 7.50					19420 7.50	19420 7.50	20890 7.50	21140 7.50			22680 7.50		23430 7.50	21660 8.25	21660 8.25
Power Transformer, 25 Cycle	19290 9.50	19290 9.50						22060 9.50	23190 9.50	23110 9.50			22470 9.50		23560 9.50		22610 10.75
Power Transformer, 220 Volts									23040 11.50	23060 11.50							
Power-transformer cover or lid, 60 cycle	17824 .50	17824 .50					17824 .50	17824 .50	20469 .50	17824 .50			17824 .50		17824 .50	17824 .50	17824 .50
Power-transformer-cover spring, 60 cycle	17825 .10	17825 .10					17825 .10	17825 .10	17825 .10	17825 .10			17825 .10		17825 .10	17825 .10	17825 .10
Power-transformer cover or lid, 25 cycle	17824 .50	17824 .50						17824 .50	20469 .50	20469 .50			20469 .50		20469 .59		21032 .50
AUDIO INPUT TRANSFORMER			19870 4.00	19870 4.00							23510 4.00	19870 4.00		23440 4.00		21670 3.75	21670 3.75
Audio-transformer or choke strap			19463 .10	19463 .10							19463 .10	19463 .10					
R. F. TRANSFORMER group⑨	19797 3.00	19797 3.00	20165 3.00	20165 3.00	20407 3.00	20406 3.00	20361 3.00	20361 3.00	21241 3.00	21242 3.00	21274 3.00	21243 3.00	20361 3.00	21244 3.00	21436 3.00	21245⑫ 3.00	21246⑫ 3.00
R. F. Transformer cap (aluminum)	19443 .05	19443 .05	19443 .05	19443 .05			19443 .05	19443 .05	19443 .05	19443 .05	19443 .05	19443 .05	19443 .05	19443 .05	19443 .05	19443 .05	19443 .05
OSCILLATOR TRANSFORMER	19260 1.00	20210⑩ 1.25	19260 1.00	19920 1.25	19660 1.00	19970 1.25	19260 1.00	20270⑳ 1.25	20910 1.25	20910 1.25	22150 1.25	22110 1.00	22670 1.25	22150 1.25	21580 1.25	22240 1.25	21580 1.25
Oscillator-transformer shield		20348 .30		20127 .30		20127 .30		20313 .50	20313 .50	20313 .50	20313 .50	20906 .50	20313 .50	20313 .50	20313 .50	20313 .50	20313 .50
1st.-I. F. Transformer, less trimmers														20713⑪ 2.00	20713 2.00	20713 2.00	20713 2.00
2nd-I. F. transformer, less trimmers														20963⑪ 2.00			
2nd-detector I. F. transformer, less trimmers	19573 2.00	19573 2.00	19573 2.00	19573 2.00	19573 2.00	19573 2.00	19573 2.00	19573 2.00	20621 2.00	19573 2.00	21031 2.00	19573 2.00	19573 2.00		20716 2.00	20716 2.00	20716 2.00
SHIELD for R. F. or I. F. transformer	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50
FILTER-CHOKE UNIT			19770 5.00	19770 5.00								19770 5.00				21680 5.75	21680 5.75
Filter-choke cover or lid			17824 .50	17824 .50								17824 .50				17302 .20	17302 .20
Filter-choke cover spring			17825 .10	17825 .10								17825 .10					
Antenna choke	19250 .60		19250 .60		19250 .60		19250 .60										
R. F. line choke No. 1 or No. 2			17254 .50	17254 .50								17254 .50		17254 .50			
R. F. plate choke					⑮	17015 .50					17015 .50				17015 .50	17015 .50	17015 .50

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)

FOR MODEL 80, 82, 82-D, 82-Q, 83, 84, 84-D, 84-Q, 85, 85-Q, 86, 87 and 89

(Numbers in Circles Refer to Notes on Page 317)

NAME OF PART	Model 84, 84F		Model 84 D		Model 84 Q		Model 85, 85F		Model 80, 80F	Model 82, 82F	Model 82Q	Model 82D	Model 83, 83F	㉔ Model 85Q	㉕ Model 86, 86F	Model 87	㉕ Model 89, 89F 89P
	Early Type①	Later Type	Early Type①	Later Type	Early Type①	Later Type	Early① Type②	Later Type									
1st-detector plate choke	19571 1.00	20331 1.00	19571 1.00	19571 1.00	19571 1.00	19571 1.00	19571 1.00	20307 1.00	17390 1.00	20307 1.00	20307 1.00	19571 1.00	20307 1.00	⑪			
1st-detector filter choke	19210 .25				19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25		19210 .25	19210 .25	19210 .25	19210 .25	
I. F. stopping choke	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25	19210 .25			
I. F. filter choke											19210 .25			19210 .25			19210 .25
1st-I. F. grid choke		17390 .60						17390 .60	20307 .60	17390 .60	17390 .60		17390 .60	⑪			
2nd-I. F. plate choke														20307 1.00			
2nd-detector plate or pentode grid choke	17390 60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60			
2nd-detector grid, or 1st-A. F. grid, choke														17390 .60	17390 .60		
Oscillator plate choke											17015 .50			17015 .50			
Control plate choke (R. F. grid choke in 86)															19210 .25		19210 .25
FLEXIBLE AND WIRE-WOUND RESISTORS (for tubular resistors, see Page 317).																	
1st-detector bias resistor	19190 ⑬ .20	20380 .20							21030 .20				21030 .20				
I. F. bias resistor	16320 .20		19830 .15	19830 .15			16320 .20					19830 .15					
A. F. bias resistor																21420 .20	21420 .20
Filament-shunt resistor	17077 .15	17077 .15					17077 .15	17077 .15	17077 .15	17077 .15			17077 .15		17077 .15	17077 .15	17077 .15
2nd-A. F. filament shunt resistor			19820 .20	19820 .20								19820 .20					
Filament-series resistor No. 1			19850 1.00	19850 1.00	19610 .15	19610 .15					19610 .15	19850 1.00		19610 .15			
Filament-series resistor No. 2			19840 .20	19840 .20								19840 .20					
Bleeder resistor No. 1	16330 .40	16330 .40					16330 .40	20150 .40		20150 .40					20150 .40	22660 .40	21050 .40
Bleeder Resistor No. 2	16330 .40	17610 .40					16330 .40	16330 .40		20140 .40					20140 .40	22660 .40	20150 .40

Bleeder resistor No. 3		18520 .20						20050 .20		20050 .20					16320 .20	20040 .20	21030 .20
Bleeder resistor No. 4								20040 .20	20040 .20	20040 .20			20040 .20		17380 .20		17380 .20
Bleeder resistor No. 5								20150 .40		20150 .40					20150 .40		20150 .40
Bleeder resistor No. 6								20120 .20		20120 .20					20120 .20		20120 .20
Bleeder resistor No. 7								20520 .20		20520 .20					20520 .20		17610 .40
1st-detector plate resistor		20320 .20															
Filter resistor	19180⑭ 1.00	19180⑭ 1.00					19180 1.00	19180⑭ 1.00		19180⑭ 1.00					19180⑭ 1.00		
Dial-light resistor															18236 .15	18236 .15	18236 .15
VARIABLE CONDENSER ROTOR, STATOR AND FRAME	19861 6.00	19861 6.00	19861 6.00	19861 6.00	19861 6.00	19861 6.00	19861 6.00	19861 6.00	21252 5.00	21252 5.00	21252 5.00	21252 5.00	19861 6.00	19861 6.00	21358 9.60	20794⑫ 9.60	20794⑫ 9.60
Rotor connection, long	18844 .10	18844 .10	18844 .10	18844 .10	18844 .10	18844 .10	18844 .10	18844 .10	20235 .10	20235 .10	20235 .10	20235 .10	18844 .10	18844 .10	20795 .10	20795 .10	20795 .10
Rotor connection, short	19554 .10	19554 .10	19554 .10	19554 .10	19554 .10	19554 .10	19554 .10	19554 .10					19554 .10	19554 .10	20796 .10	20796 .10	20796 .10
Stopping spring	19968 .12	19968 .12	20065 .12	20065 .12	20065 .12	20065 .12	19968 .12	19968 .12					19968 .12	19968 .12	19968 .12	19968 .12	19968 .12
Dial-knob shaft	18809 .05	18809 .05	18809 .05	18809 .05	18809 .05	18809 .05	19751 .05	19751 .05	18809 .05	18809 .05	18809 .05	18809 .05	19751 .05	19751 .05	17941 .05	17941 .05	17941 .05
Dial-knob shaft bracket	19505 .30	19505 .30	19505 .30	19505 .30	19505 .30	19505 .30	19505 .30	19505 .30	20116 .30	20116 .30	20116 .30	20116 .30	19505 .30	19505 .30	18144 .30	18144 .35	18144 .35
Dial-knob-shaft-bracket support	17935 .03	17935 .03	17935 .03	17935 .03	17935 .03	17935 .03	17935 .03	17935 .03					17935 .03	17935 .03	17935 .03	17935 .03	17935 .03
Dial rubber and bushing	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15
Dial pointer	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05
Dial-pointer shim	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02
Dial gear and balance weight	19529 .75	19529 .75	19529 .75	19529 .75	19529 .75	19529 .75	19529 .75	19529 .75	20149 .75	20149 .75	20149 .75	20149 .75	19529 .75	19529 .75			
Dial gear															18615 .40	18615 .40	18615 .40
Balance weight															18117 .35	18117 .35	18117 .35
Pointer control arm															17962 .30	17962 .30	17962 .30
Trimmer mica	17062 .03	17062 .03	17062 .03	17062 .03	17062 .03	17062 .03	17062 .03	17062 .03	20119 .03	20119 .03	20119 .03	20119 .03	17062 .03	17062 .03	17062 .03	17062 .03	17062 .03
MULTIPLE-TYPE BY-PASS CONDENSER (Other by-pass condensers are listed on Page 309)									20830 2.00				20830 2.00			22570 2.00	

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)

FOR MODEL 80, 82, 82-D, 82-Q, 83, 84, 84-D, 84-Q, 85, 85-Q, 86, 87 and 89

(Numbers in Circles Refer to Notes on Page 317)

NAME OF PART	Model 84, 84F Early Type①	Model 84, 84F Later Type	Model 84 D Early Type①	Model 84 D Later Type	Model 84 Q Early Type①	Model 84 Q Later Type	Model 85, 85F Early① Type②	Model 85, 85F Later Type	Model 80, 80F	Model 82, 82F	Model 82Q	Model 82D	Model 83, 83F	㉔ Model 85Q	㉕ Model 86, 86-F	Model 87	㉕ Model 89, 89F 89P
FILTER CONDENSER UNIT, paper and foil type								20370 $7.50					20370 $7.50		20370 $7.50	21520 $7.95	21520 $7.95
Filter-condenser cover and spring								20398 .45					20398 .45		20398 .45	18188 .45	18188 .45
Filter condenser No. 1 (Electrolytic)	19728 $2.60	19728 $2.60	20049 $2.60	20049 $2.60	19728 $2.60	19728 $2.60	19728 $2.60		19728 2.60	19728 $2.60	19728 $2.60	20049 $2.60		19060 $2.50			
Filter condenser No. 2 (Electrolytic)	19060 2.50	19060 2.50					19728 2.60		19060 2.50	19060 2.50							
Filter condenser No. 3 (Electrolytic)							19060 2.50	19060 2.50					19060 2.50		19060 2.50		
Fibre insulating case for electrolytics	19551 .10	19551 .10	19551 .10	19551 .10	19551 .10	19551 .10	19551 .10		19551 .10	19551 .10	19551 .10	19551 .10					
MOUNTING ACCESSORIES FOR EARLY-TYPE ELECTROLYTICS																	
Case solder clip	19559 .01	19729 .02	19559 .01	19729 .02	19559 .01	19729 .02	19559 .01		19729 .02	19729 .02	19729 .02	19729 .02					
Base insulator	19558 .20		19558 .20		19558 .20		19558 .20										
Mounting nut	19556 .05		19556 .05		19556 .05		19556 .05										
Mounting lockwasher	19557 .03		19557 .03		19557 .03		19557 .03										
MOUNTING ACCESSORIES FOR LATER-TYPE ELECTROLYTICS																	
Clamp for electrolytics with fibre case		19936 .10		19936 .10		19936 .10			19936 .10	19936 .10	19936 .10	19936 .10					
Clamp for electrolytics without fibre case		19716 .10						19716 .10	19716 .10	19716 .10			19716 .10	19716 .10	19716 .10		
Clamp screw		19543 .25/c		19543 .25/c		19543 .25/c		19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c		
Clamp nut		19784 .01		19784 .01		19784 .01		19784 .01	19784 .01	19784 .01	19784 .01	19784 .01	19784 .01	19784 .01	19784 .01		
Clamp rivet		17068 .01		17068 .01		17068 .01		17068 .10	17068 .01	17068 .01	17068 .01	17068 .01	17068 .01	17068 .01	17068 .01		
TRIMMER CONDENSERS																	
Antenna trimmer	20340 .60	20340 .60	20340 .60	20340 .60	20340 .60	20340 .60	19326 .60	19326 .60	20340 .60	20340 .60	20340 .60	20340 .60	19326 .60	19326 .60	19326 .60	19326 .60	19326 .60
Antenna-trimmer mounting bushing	19501 .03	19501 .03	19501 .03	19501 .03	19501 .03	19501 .03			19501 .03	19501 .03	19501 .03	19501 .03					
Antenna-adjustment instruction-tag	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F 859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02	20753 F-859 .02
Single I. F. trimmer	17240 .50	17240 .50	17240 .50	17240 .50	17240 .50	17240 .50	19330 .70	19330 .70	17240 .50	17240 .50	17240 .50	17240 .50	19330 .70	19330 .70			

Double I. F. trimmer	18150 .95	18150 .95	19910 1.10	19910 1.10	18150 .95	18150 .95	18150 .95	18150 .95	18150 .95	18150 .95	18150 .95	19910 1.10	18150 .95	18150 .95	18150 .95	18150 .95	18150 .95
Double-spot trimmer	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35	17230 .35			
Trimmer-condenser sealing wax (used in all sets)	.50 lb.																
SMALL FIXED CONDENSERS (See Page 317 for identification.)																	
R. F.-1st detector stopping condenser						17974 .35					21160 .35				⑮	⑮	⑮
Oscillator grid condenser		17470 .35						21160 .35	21160 .35	21160 .35	21160 .35		21160 .35	21160 .35	21160 .35	21160 .35	21160 .35
I. F. stopping condenser	17440 .50	17440 .50	17440 .50	17440 .50	17440 .50	17440 .50	17440 .50	21160 .35	21160 .35	21160 .35	21160 .35	21160 .35	21160 .35	21160 .35			
Phone condenser	17440 .50	17440 .50	17440 .50		17440 .50	17440 .50	17440 .50	17440 .50			17440 .50			17440 .50			
A. F. Grid condenser																22220 .35	22220 .35
SOCKETS																	
R. F. Socket					19962 .25	19958 .25					20237 .25				20236 .30	20236 .30	20236 .30
1st-detector socket	17518 .30	20306 .30	20025 .30	20025 .30	19958 .25	19958 .25	17518 .30	20236 .30	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20236 .30
I. F. Socket	17518 .30	20306 .30	20025 .30	20025 .30	19958 .25	19958 .25	18774 .30	20236 .30	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20236 .30
2nd-detector socket	17518 .30	17518 .30	20025 .30	20025 .30	19958 .25	19958 .25	17518 .30	20236 .30	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20236 .30
1st-A. F. socket			20026 .30	20026 .30	19959 .25	20184 .25					20237 .25	20236 .30		20237 .25		20236 .30	20236 .30
Pentode socket	19955 .30	19955 .30	19964 .30	19964 .30	19964 .30	19964 .30	19955 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30
Rectifier socket	18813 .25	18813 .25					17508 .25	20237 .25	20237 .25	20237 .25			20237 .25		21448 .30	20237 .25	20237 .25
Speaker socket	19648 .25	19648 .25	18007 .30	18007 .30	19963 .25	19963 .25	17512 .25	20329 .25	20329 .25	20329 .25	20665 .25	20664 .30	20329 .25	20665 .25	21336 .30	20664 .30	20664 .30
Oscillator socket	19533 .30	19533 .30	20026 .30	20026 .30	19961 .25	19961 .25	17519 .30	20236 .30	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20237 .25	20236 .30	20236 .30	20236 .30
Automatic volume control socket								20236 .30		20236 .30					20236 .30		20236 .30
Socket insulator (fibre sheet)	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377⑯ .25/c	17377⑯ .25/c	17377⑯ .25/c
Socket eyelet	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c
Fuse socket	18449 .15	18449 .15	18449 .15	18449 .15	18449 .15		18449 .15	18449 .15		18449 .15		18449 .15	18449 .15		18449 .15	18449 .15	18449 .15
TUBE SHIELD	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15	15213 .15
Tube-shield base	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03
Tube-shield base rivet	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c
BATTERY CABLE					19939 3.50	19939 3.50					21665 3.75			21664 3.50			
Battery-cable clamp					15739 .02	15739 .02					15739 .02			15739 .02			

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)

FOR MODEL 80, 82, 82-D, 82-Q, 83, 84, 84-D, 84-Q, 85, 85-Q, 86, 87 and 89

(Numbers in Circles Refer to Notes on Page 317)

NAME OF PART	Model 84, 84F		Model 84 D		Model 84 Q		Model 85, 85F		Model 80, 80F	Model 82, 82F	Model 82Q	Model 82D	Model 83, 83F	㉔ Model 85Q	㉕ Model 86, 86-F	Model 87	㉕ Model 89, 89F 89P
	Early Type①	Later Type	Early Type①	Later Type	Early Type①	Later Type	Early① Type②	Later Type									
Battery-cable terminal-clip					8352 $.06	8352 $.06					8352 $.06			8352 $.06			
Battery-cable instruction tag					19941 F-772 .02	19941 F-772 .02					21625 F-855 .02			21625 F-855 .02			
110-VOLT DOUBLE-CONDUCTOR CABLE AND PLUG	19566 $1.90	19566 $1.90	19566 $1.90	19566 $1.90			19566 $1.90	19566 $1.90	19566 $1.90	19566 $1.90		19566 $1.90	19566 $1.90		19566 $1.90	19566 $1.90	19566㉓ $1.90
110-volt-cable instruction tag			20073 .02	20073 .02								20073 .02					
110-volt plug (male)	18897 .15	18897 .15	18897 .15	18897 .15			18897 .15	18897 .15	18897 .15	18897 .15		18897 .15	18897 .15		18897 .15	18897 .15	18897 .15
110-volt cable bushing	16741 .05	16741 .05	16741 .05	16741 .05			16741 .05	16741 .05	16741 .05	16741 .05		16741 .05	16741 .05		16741 .05	16741 .05	16741 .05
Bushing retaining spring	16742 .05	16742 .05	16742 .05	16742 .05			16742 .05	16742 .05	16742 .05	16742 .05		16742 .05	16742 .05		16742 .05	16742 .05	16742 .05
BINDING-POST BASE	18363 .05	18363 .05	18363 .05	18363 .05	18363 .05	18363 .05			18363 .05	18363 .05	18363 .05	18363 .05			18363 .05		18363 .05
Binding post, marked "A"	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20
Binding post, ground	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	18546 .20
Miscellaneous Parts																	
Self-tapping screw (3/8" long)⑰	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02
Line fuse (2 amperes)	18534 .05	18534 .05	18534 .05	18534 .05	18534 .05		18534 .05	18534 .05		18534 .05		18534 .05	18534 .05		18534 .05	18534 .05	18534 .05
Control-grid lead and cap	19623 .12	19623 .12	21108 .15	21108 .15	19623 .12	19623 .12	19623 .12	19623 .12	19623 .12	19623 .12	19623 .12	21108 .15	19623 .12	19623 .12	21555 .12	19623 .12	19623 .12
Fibre disc (1" dia.) with two lugs (used as a terminal block for wire connections)	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05	22530 .05
Bottom plate							19869 1.30	19869 1.30					19869 1.30	19869 1.30	19869 1.30	19869 1.30	19869 1.30
Ground clamp assembly	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30
Cardboard packing tube (fits on speaker field case)	19699 .10	19699 .10	19699 .10	19699 .10					19699 .10	19699 .10		19699 .10					
Instruction and log card for 60-cycle, battery and D. C. models	19542 F-755 .01 Net	20339 F-795 .01 Net	19995 F-777 .01 Net	20395 F-793 .01 Net	19934 F-774 .01 Net	20374 F-792 .01 Net		19858 F-767 .01 Net	20565 F-808㉖ .01 Net	20608 F-809㉖ .01 Net	21626 F-853 .01 Net	20877 F-817 .01 Net	20875 F-811 .01 Net	21627 F-854 .01 Net	21549 F-850 .01 Net	20923 F-812 .01 Net	20729 F-813⑱ .01 Net
Instruction and log card for 25-cycle models	19851 F-766 .01 Net	20405 F-797 .01 Net						19875 F-771 .01 Net	20948 F-820 .01 Net	20949 F-821 .01 Net			20951 F-822 .01 Net		21603 F-857 .01 Net		20991 F-826 .01 Net
Shipping container for 60-cycle, battery and D. C. models	19541 .55 Net	20337 .55 Net	20003 .55 Net	20394 .55 Net	19935 .55 Net	20373 .55 Net	19863 .65 Net	19863 .65 Net	20457 .55 Net	20559 .55 Net	21187 .55 Net	21122 .55 Net	21046 .65 Net	20966 .65 Net	21517 .65 Net	21526 .65 Net	20724⑱ .65 Net
Shipping container for 25-cycle models	19541 .55 Net	20422 .55 Net						19876 .65 Net	21353 .55 Net	21365 .55 Net			21368 .65 Net		21651 .65 Net		21374 .65 Net

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

Figures in circles in the parts list refer to the corresponding notes listed below. It is important to read these notes before ordering parts.

① Changes from early type to late type were not made all at one time.

② 85-F was made only in later type.

③ Front panel in 89-P is No. 21318.

④ Salvage and use leads from the original control.

⑤⑥ Control No. 20389 includes the on-off switch which is NOT sold separately.

⑦ The on-off switch (on back of volume control) is NOT sold separately. Replace the complete volume control unit.

⑨ R. F. transformers are not sold separately.

⑩ No. 20210 has 8 leads. Some 84 (A. C.) sets have a 19920 cylindrical transformer with 6 leads, requiring a No. 20127 shield. A few late 84 (A. C.) sets have a 20210A transformer with 6 leads and a mica condenser mounted on the side. This requires a No. 20348 shield.

⑪ In late-type Model 85-Q, the 1st-I. F. transformer is not used; the 2nd-I. F. transformer is No. 20713, and the following additional parts are used: 1st-detector plate choke No. 20307, and 1st-I. F. grid choke No. 17390.

⑫ In Model 87 after 2525451, 89 after 6743355, 89-F after 1585176, and 89-P after 1935231, the R. F. transformer group is No. 21436, and the variable condenser unit is No. 21358.

⑬ No. 19190 is superseded by 19346.

⑭ No. 19180 resistor is not used in 84-F, 82-F, 85-F, 86-F.

⑮ Sold only as part of the R. F. Trans. group.

⑯ Speaker socket insulator is No. 18016.

⑰ Used also are No. 21007 (⅞″) and No. 19717 (1″) self-tapping screws.

⑱ Log card in 89-P is 21025. Shipping container in 89-P is 21273.

⑲ Screen in 80 is 20596. Screen in 82, 82-D, 82-Q is 20601.

⑳ In late-type Model 85, after serial No. 4998356, and Model 85-F after No. 5055609, the oscillator transformer is No. 22670.

㉑ In a few early-type Model 82-Q and 85-Q, the volume control is No. 19040 and a blue-and-red resistor is shunted across the control. In all other 82-Q and 85-Q, the volume control is No. 16122 and the red-and-blue resistor is not used.

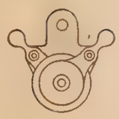
㉒ In late-type Model 87, 89, 89-F and 89-P, the output transformer has a metal cover. This transformer, less cover is No. 21693. The insulator for this transformer is No. 21424, list price $.02.

㉓ In 89-P, the 110-volt cable is No. 18589, list price $1.00.

㉔ The list of parts for Model 85-Q apply only to sets having serial numbers below 163767.

㉕ The list of parts for Model 86, 89, 89-F, and 89-P apply only to sets having serial numbers as follows: Model 86 below 5876861. Model 89 below 6755181. Model 89-P below 1935904. Model 89-F below 1585395.

㉖ Instruction and log card for Model 80 (220-volt type) is No. 20904, F-823, $.01 net. The log card for Model 82 (220-volt type) is No. 20905, F-824, $.01 net.



IDENTIFICATION OF SMALL FIXED CONDENSERS OF TYPE ILLUSTRATED AT LEFT

Part No.	*Identification*
17440	Copper washers, 7 plates.
17470	"X" scratched on fibre, 4 plates.
17974	Aluminum washers, 4 plates.
21160	Black-finished washers, 4 plates.
22220	Brass-washers, 2 plates.

TUBULAR RESISTORS

(Large Size, 1¾ inches long)

USED IN PENTODE-TYPE RECEIVERS

Part No.	**Identifying Color*	*List Price*
15285	Gray	$ .50
15544	Yellow	.25
15545	Maroon	.25
15592	Black	.25
15891	Black-red	.25
15892	Green	.25
16282	Blue-red	.25
16724	White	.25
19346	Green-red	.30
19581	Red-yellow	.25
19649	Black-purple	.25
20151	Purple	.25
20223	Red-gray	.25

MOUNTING ACCESSORIES FOR LARGE-SIZE TUBULAR RESISTORS

Part No.	*Name*	*List Price*
19508	Single-resistor clamp	$ .05
17341	Three-resistor bracket	.05
17342	Three-resistor pad	.25/c
17345	Three-resistor clamp	.02
17118	Five-resistor bracket	.05
17117	Five-resistor pad	.25/c
17119	Five-resistor clamp	.02

TUBULAR RESISTORS

(Small Size, 1 inch long)

USED IN PENTODE-TYPE RECEIVERS

Part No.	**Identifying Color*	*List Price*
20920	Red-yellow	$ .25
20930	Black-purple	.25
20940	Green	.25
20950	Maroon	.25
20960	Gray-yellow	.25
20970	Gray	.25
20980	Red-blue	.25
21040	Black	.25
21050	Blue-gray	.25
23120	Red-black	.25
23130	Red-gray	.25

*When replacing a tubular resistor, use a resistor of the same identifying color and size. The background color of the resistor is disregarded in the identification except in the case of the all-white or all black resistors. If a resistor has black-and-red coloring on a white base, the identification is black and red, not black, white and red.

November, 1931. THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST FOR SPEAKERS IN PENTODE-TYPE RECEIVERS

Numbers in circles refer to notes on Page 317.

NAME OF PART	No. 17300 Compact Speaker in MODEL 80, 82, 84	No. 18600 Compact Speaker MODEL 82-D, 84-D	No. 18400 Compact Speaker MODEL 82-Q, 84-Q	No. 18500 Compact Speaker with output trans. sealed in cylindrical container	No. 18100 Console Speaker MODEL 83, 85 (Early Type)	No. 20500 Console Speaker with output trans. sealed in cylindrical container	No. 19900 Console Speaker in Model 85-Q	No. 24600 Console Speaker in Model 86 and late Models 83 and 85	No. 19800 Console Speaker in Model 87, 89, 89-F, 89-P
DIAPHRAGM	19465 $2.25	19465 $2.25	19465 $2.25	19465 $2.25	19465 $2.25	19465 $2.25	19465 $2.25	20737 $3.25	20737 $3.25
Diaphragm-holding segment (3 used)	19469 .15	19469 .15	19469 .15	19469 .15				14382 $1 set	14382 $1 set
Diaphragm-holding segment screw	14394 .30/c	14394 .30/c	14394 .30/c	14394 .30/c				14394 .30/c	14394 .30/c
Diaphragm-spider screw	4795N .30/c	4795N .30/c	4795N .30/c	4795N .30/c	4795N .30/c	4795N .30/c	4795N .30/c	4795N .30/c	4795N .30/c
Diaphragm-spider washer (hex. metal)	19459 .02	19459 .02	19459 .02	19459 .02	19459 .02	19459 .02	19459 .02	19459 .02	19459 .02
Diaphragm-spider washer (fibre)	19471 .30/c	19471 .30/c	19471 .30/c	19471 .30/c	19471 .30/c	19471 .30/c	19471 .30/c	19471 .30/c	19471 .30/c
Diaphragm (or cone) housing	19484 1.75	20008 1.75	20231 1.75	19909 1.75	19484 1.75	19909 1.75	20231 1.75	20894 2.50	20894 2.50
FIELD COIL	18870 3.00	19860 3.00		18870 3.00	18870 3.00	18870 3.00		18870 3.00	21260 3.00
Field-coil insulator	19458 .02	19458 .02		19911 .05	19458 .02	19911 .05		19458 .02	19458 .02
Field-coil washer back (2⅛″ dia.)	19479 .50/c	19479 .50/c		19479 .50/c	19479 .50/c	19479 .50/c		19479 .50/c	19479 .50/c
Field-coil washer front (2⅜″ dia. padded)	20147 .05	20147 .05		20147 .05	20147 .05	20147 .05		20147 .05	20147 .05
TOP POLE PIECE	19454 .65	19454 .65		19454 .65	19454 .65	19454 .65		19454 .65	19454 .65
Top-pole-piece mounting screw	19538 .03	19538 .03		19538 .03	19538 .03	19538 .03		19538 .03	19538 .03
Top-pole-piece mounting nut	14367 .02	14367 .02		14367 .02	14367 .02	14367 .02		14367 .02	14367 .02
MAGNET ASSEMBLY COMPLETE			19918 6.00				19918 6.00		
OUTPUT TRANSFORMER, with strap	19697 2.25	19697 2.25	19697 2.25	19670 3.00	19697 2.25	19670 3.00	19697 2.25		21370 3.00
Output-transformer strap	19463 .10	19463 .10	19463 .10		19463 .10		19463 .10		19463 .10
Output-transformer (less case)㉒								21672 3.00	21693 3.00

Output-transformer case㉒								21418 .40	21418 .40
Output-transformer fibre insulator	19478 .02	19478 .02	19478 .02		19478 .02		19478 .02	21424 .02	19478㉒ .02
Output-transformer mounting screw	7697 .30/c	7697 .30/c	7697 .30/c	7697 .30/c	7697 .30/c	7697 .30/c	7697 .30/c	7697 .30/c	7697 .30/c
Output-transformer mounting nut	8188 .01	8188 .01	8188 .01	8188 .01	8188 .01	8188 .01	8188 .01	8188 .01	8188 .01
CABLE AND PLUG ASSEMBLY	19487 1.60	20012 1.65	19916 1.40	19487 1.60	19789 1.65	19789 1.65	20889 1.50	19789 1.65	20657 1.65
Plug only	15079 .65	18582 .65	19884A .40	15079 .65	15079 .65	15079 .65	19884A .40	15079 .65	18582 .65
Cable Clamp	19508 .05	19508 .05	19508 .05	19508 .05	19508 .05	19508 .05	19508 .05	19508 .05	19508 .05
PROTECTIVE LAMP (75 watts)		20075 .35 net							
Lamp socket		20014 .50							
Lamp socket screw		20136 .25/c							
Miscellaneous									
Speaker-mounting screw	19526 .01	19526 .01	19526 .01	19526 .01					
Speaker-mounting nut	15006 .02	15006 .02	15006 .02	15006 .02					
Speaker-mounting plate					19755 .75	19755 .75	19755 .75		
Speaker-mounting-plate screw					19882 .01	19882 .01	19882 .01		
CLOTH SCREEN	19691⑲ .75	19691⑲ .75	19691⑲ .75	19691 .75	18959 1.00	18959 1.00	18959 1.00	18959 1.00	18959 1.00
GAUGES centering voice coil (set of 3)	20171 .10	20171 .10	20171 .10	20171 .10	20171 .10	20171 .10	20171 .10	20171 .10	20171 .10
SHIPPING CONTAINER					19837 .35 Net	20493 .35 Net	20806 .35 Net	20739 .35 Net	20739 .35 Net
Instruction Sheet						19868 .02 Net			
Speaker Packing Tube						20447 .10			

NOTE: No. 20171 Centering Gauges supersede No. 14622. The No. 20171 gauges are "double-ended," one end being used for type F, N and J speakers, and the other end is used for the speakers in Model 84 and 85, etc.

The top pole piece may be centered by use of three lengths of 3/64 inch drill rod.

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

SERVICE NOTES

With the exception of Model 81 Motor Car Radio, which has a tuned-radio-frequency circuit, all the receivers described in this supplement employ the super-heterodyne circuit and utilize a frequency of 130 kilocycles for intermediate-frequency amplification.

A general description of the super-heterodyne system appears on page 258 of the Service Manual. A description of the pentode tube is given on page 17. Service notes covering the general adjustment of trimmer condensers, double-spot reception, and testing equipment, are given on pages 259, 260, 261, 262 and 275. Much of this information may be applied in servicing Models 80, 82, 83, 84, 85, 86, 87 and 89.

We want to emphasize the following points:

1. The antenna adjustment must be correctly adjusted in accordance with the instructions accompanying each set.
2. The tube shields and transformer shields must be tightly seated.
3. Try new tubes before attempting any adjustments or repairs.
4. When replacing a tubular resistor, use a resistor of the same identifying color. In a few cases, owing to engineering changes, the color of a resistor in a chassis may not agree with the color specified in the diagram. In such a case, disregard the diagram and use a replacement resistor having the same color as the defective unit. However, if a resistor has been removed, or its identification destroyed, replace it with a resistor having the color that is specified in the diagram for that set. A list of tubular resistors is given on page 317.

VOLTAGE TABLE

FOR MODEL 80, 81, 82, 82-D, 82-Q, 83, 84, 84-D, 84-Q, 85, 85-Q, 86, 87 and 89

The voltages listed in this table are only approximate, and are measured values, not actual operating values. Turn volume control to maximum.

Use 250-volt scale of a 1000-ohm-per-volt D. C. voltmeter.

All plate, screen and grid measurements are made from cathode in heater-type tube, and from —F in plain-filament-type tube.

		MODEL 80	MODEL 81	MODEL 82	MODEL 82-D	MODEL 82-Q	MODEL 83	MODEL 84	MODEL 84-D	MODEL 84-Q	MODEL 85	MODEL 85-Q	MODEL 86	MODEL 87	MODEL 89
	LINE VOLTAGE	110	—	110	112	—	110	110	120	—	110	—	115	110	110
	TOTAL "B" VOLTAGE	—	125	—	—	125	—	—	—	125	—	125	—	—	—
R. F. Tube**	FILAMENT	—	5.5	—	—	2	—	—	—	2	—	—	2.4	2.4	2.4
	PLATE	—	125	—	—	125	—	—	—	125	—	—	125	170	125
	SCREEN	—	75	—	—	60	—	—	—	65	—	—	40	80	50
	GRID	—	SMALL	—	—	3	—	—	—	3	—	—	2	2	2
1st Det. Tube†	FILAMENT	2.4	5.5	2.4	5.5	2	2.4	2.4	5.7	2	2.4	2	2.4	2.4	2.4
	PLATE	225	95	135	70	125	225	205	80	125	135	125	125	160	120
	SCREEN	90	—	50	50	40	90	65	50	25	50	40	35	70	45
	GRID	5	7	4	5	3	5	6	5	3	3	3	4	11	4
I. F. Tube	FILAMENT	2.4	—	2.4	6	2	2.4	2.4	6.5	2	2.4	2	2.4	2.4	2.4
	PLATE	230	—	140	95	125	230	215	105	125	135	125	125	170	125
	SCREEN	95	—	50	50	60	95	65	55	65	50	65	40	80	50
	GRID	2	—	SMALL	SMALL	3	2	3	SMALL	SMALL	2	3	2	2	2
2nd Det. Tube	FILAMENT	2.4	—	2.4	5.5	2	2.4	2.4	5	2	2.4	2	2.4	2.4	2.4
	PLATE	110	—	105	55	45	110	90	55	60	100	40	95	90	120
	SCREEN	45	—	65	10	25	45	45	10	25	65	25	60	—	—
	GRID	5	—	8	2	3	5	6	1	3	7	3	8	SMALL	15
1st A. F. Tube	FILAMENT	2.4	5.5	2.4	5.5	2	2.4	2.4	6	2	2.4	2	2.4	2.4	2.4
	PLATE	230	120	230	75	55	230	205	80	55	215	55	210	90	120
	SCREEN	240	123	240	—	—	240	215	—	—	225	—	220	—	—
	GRID	4	11	5	3	3	4	5	2.5	3	5	3	5	3	4
2nd A. F. Tube	FILAMENT	—	—	—	2	2	—	—	2	2	—	2	—	2.4	2.4
	PLATE	—	—	—	85	120	—	—	90	120	—	120	—	200	225
	SCREEN	—	—	—	90	125	—	—	95	125	—	125	—	210	235
	GRID	—	—	—	7	15	—	—	7	5	—	15	—	14	14
Osc. Tube	FILAMENT	2.4	—	2.4	5	2	2.4	2.4	6	2	2.4	2	2.4	2.4	2.4
	PLATE	95	—	95	100	60	100	70	110	60	100	40	95	85	100
	GRID	*	—	*	*	*	*	*	*	*	*	*	*	*	*
Control Tube	FILAMENT	—	5.5	2.4	—	—	—	—	—	—	2.4	—	2.4	—	2.4
	PLATE	—	3	15	—	—	—	—	—	—	15	—	30	—	25
	SCREEN	—	—	8	—	—	—	—	—	—	7	—	7	—	5
	GRID	—	2	4	—	—	—	—	—	—	5	—	4	—	3

* The measured oscillator grid voltage will vary dependent on the capacity of the voltmeter leads. In some cases, the presence of the leads will stop oscillation and no reading will be secured for grid bias. In other cases, the reading will be only slight, or it may be as high as 10 volts.

**This includes the 1st, 2nd and 3rd R. F. tubes in Model 81. †This is the detector tube in Model 81.

November, 1931.

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ATWATER KENT RADIO

SERVICE DATA

With

PARTS AND PRICE LIST FOR

MODEL 87-D (Direct Current Operated) RECEIVER

GENERAL DESCRIPTION

Model 87-D is a console-type super-heterodyne receiver designed for 110-volt direct-current supply. It incorporates the following features—

1. Atwater Kent super-heterodyne circuit with single-spot selectivity.
2. Eight tubes, including three pentodes as audio-frequency amplifiers.
3. Quick-vision dial, tone control, electro-dynamic speaker.
4. Atwater Kent expert design and dependable construction.

SERVICE NOTES

1. The intermediate frequency is 130 kilocycles.
2. Instructions regarding adjustment of trimmers have been given previously in the supplement for Type H chassis. Much of this information may be applied in servicing Model 87-D.
3. The readings given in the table below were obtained with the 250-volt scale of a 1000-ohm-per-volt D. C. voltmeter. The values given are only approximate and are the measured values, not the actual operating voltages. All measurements are made from cathode in heater tubes and from —F in plain-filament-type tubes.

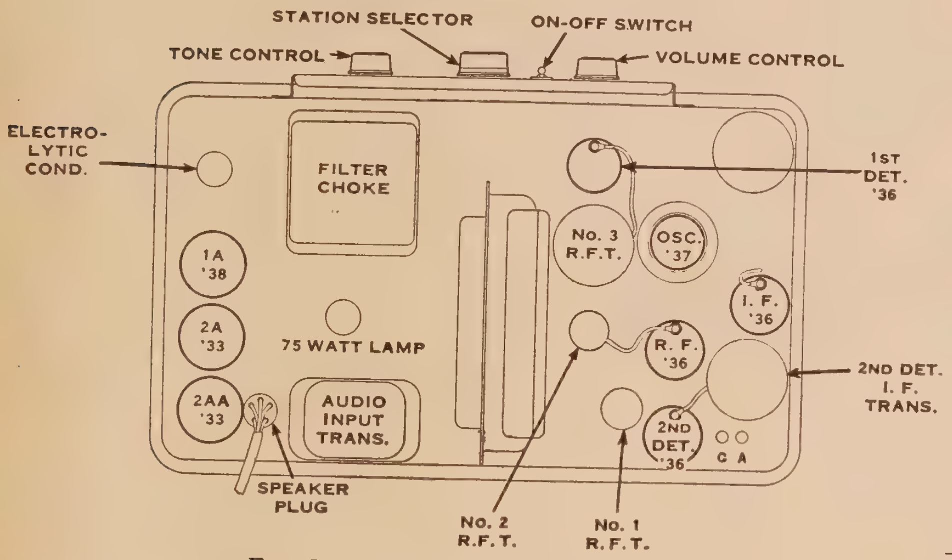

STATION SELECTOR
ON-OFF SWITCH
TONE CONTROL
VOLUME CONTROL
ELECTRO-LYTIC COND.
FILTER CHOKE
1ST DET. '36
1A '38
2A '33
2AA '33
75 WATT LAMP
AUDIO INPUT TRANS.
No. 3 R.F.T.
OSC. '37
I. F. '36
R. F. '36
2ND DET. '36
C A
2ND DET. I. F. TRANS.
SPEAKER PLUG
No. 2 R.F.T.
No. 1 R.F.T.

Fig. 322. Top View of Model 87-D.
The circle in the top right-hand corner indicates the shield for the coupling unit between the 1st-detector and the I. F. tube.

Voltage Table for Model 87-D

Turn Volume Control to Maximum
Line Voltage, 120

	APPROXIMATE VOLTAGES			
	FILAMENT	PLATE	SCREEN	GRID
R. F.	6	100	55	3
1ST-DET.	6	100	60	4
I. F.	6	100	60	3
2ND-DET.	6	65	40	SMALL
1ST-A. F.	6	93	98	4
2ND-A. F.	2	95	98	5
OSCILLATOR	6	100	—	5

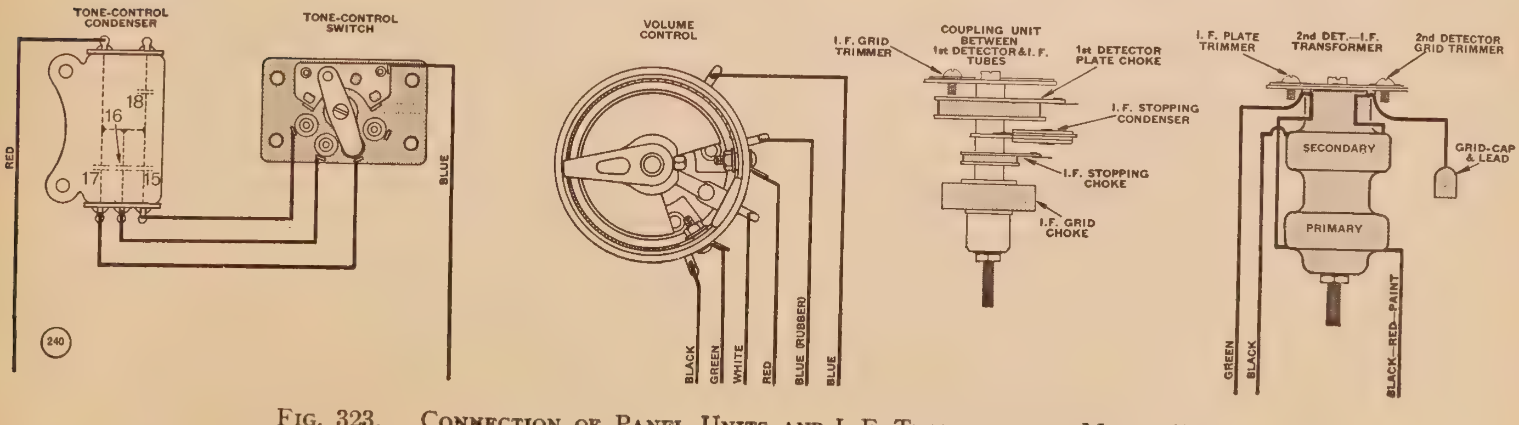

TONE-CONTROL CONDENSER
16
18
17
15
RED
TONE-CONTROL SWITCH
BLUE
240
VOLUME CONTROL
BLACK
GREEN
WHITE
RED
BLUE (RUBBER)
BLUE
I. F. GRID TRIMMER
COUPLING UNIT BETWEEN 1st DETECTOR & I. F. TUBES
1st DETECTOR PLATE CHOKE
I. F. STOPPING CONDENSER
I. F. STOPPING CHOKE
I. F. GRID CHOKE
I. F. PLATE TRIMMER
2nd DET.—I. F. TRANSFORMER
2nd DETECTOR GRID TRIMMER
SECONDARY
PRIMARY
GRID-CAP & LEAD
GREEN
BLACK
BLACK—RED—PAINT

Fig. 323. Connection of Panel Units and I. F. Transformers, Model 87-D.

December, 1931.

Printed in U. S. A.

PARTS AND PRICE LIST FOR MODEL 87-D, No. 24900 CHASSIS

Part No.	*Name of Part*	*List Price*
21815	FRONT PANEL WITH BRACES AND ESCUTCHEON	$ 2.50
17224	Front-panel brace	.10
21439	Escutcheon	1.00
8272	Escutcheon rivet	.02
16420-A	Dial-light socket and reflector	.40
16099	Dial light	.25
17814	Dial knob	.30
17244	Knob for volume control or tone control	.30
15562	Knob set-screw	.30/c
21816	VOLUME CONTROL, COMPLETE LESS LEADS	4.25
17876	Volume-control mounting bracket	.20
21530	TONE-CONTROL CONDENSER	1.00
18223	Tone-control condenser clamp	.05
16430	Tone-control switch, complete	.75
18148	Tone-control-switch base	.60
18146	Tone-control-switch shaft	.12
18112	Tone-control-switch blade	.03
13664	ON-OFF SWITCH	1.00

TRANSFORMERS

Part No.	*Name of Part*	*List Price*
23760	Audio input transformer	4.50
21814	R. F. transformer group	3.00
19443	R. F. transformer cap (aluminum)	.05
23810	Oscillator transformer	1.25
20313	Oscillator-transformer shield	.50
19573	2nd-detector I. F. transformer, less trimmers	2.00
17295	Shield for R. F. or I. F. transformer	.50

CHOKES

Part No.	*Name of Part*	*List Price*
19770	Filter-choke unit	5.00
17824	Filter-choke cover	.50
17825	Filter-choke-cover spring	.10
17254	R. F.-line choke No. 1 or No. 2	.50
19210	R. F.-grid filter choke	.25
17390	1st-detector plate choke	.60
19210	1st-detector grid- or plate-filter choke	.25
19210	I. F.-stopping choke	.25
20307	I. F. grid choke	1.00
17390	1st-A. F. grid choke	.60

FLEXIBLE AND WIRE-WOUND RESISTORS

Part No.	*Name of Part*	*List Price*
21030	1st-detector bias resistor	.20
23780	R. F.-I. F. bias resistor	.20
16320	1st-A. F. bias resistor	.20
19820	2nd-A. F. filament shunt resistor	.20
19850	Filament series resistor No. 1	1.00
19840	Filament series resistor No. 2	.20
23840	Filament series resistor No. 3	.20
21742	VARIABLE CONDENSER ROTOR, STATOR AND FRAME	9.60
20795	Rotor connection, long	.10
20796	Rotor connection, short	.10
19968	Stopping spring	.12
17941	Dial-knob shaft	.05
18144	Dial-knob shaft bracket	$ .35
17935	Dial-knob-shaft-bracket support	.03
17961	Dial rubber and bushing	.15
17959	Dial pointer	.05
18823	Dial-pointer shim	.02
18615	Dial gear	.40
18117	Balance weight	.35
17962	Pointer control arm	.30
17062	Trimmer mica	.03
20049	FILTER CONDENSER (ELECTROLYTIC)	2.60
19551	Fibre insulating case	.10
19729	Case solder clip	.02
19936	Mounting clamp	.10
19543	Mounting-clamp screw	.25/c
19784	Mounting-clamp nut	.01
17068	Mounting-clamp rivet	.01

FIXED CONDENSERS

Part No.	*Name of Part*	*List Price*
23590	By-pass No. 1 (L-55-A, H-44)	1.00
15770	By-pass No. 2 (H-15)	1.00
23610	By-pass No. 3 (L-57-A, H-45)	1.00
15262	By-pass No. 4 (H-20)	1.00
21530	Tone control (L-42-A, B-11)	1.00
23250	R. F. screen by-pass	.35
21160	Oscillator grid condenser	.35
21160	I. F. stopping condenser	.35
19330	Single I. F. trimmer	.70
19910	Double I. F. trimmer	1.10
	Trimmer-condenser sealing wax	.50 lb.

SOCKETS

Part No.	*Name of Part*	*List Price*
20236	R. F., 1st-det., I. F., 2nd-det., A. F. or osc. socket	.30
21337	Speaker socket	.35
17377	Tube-socket insulator	.25/c
18016	Speaker-socket insulator	.25/c
8249	Socket eyelet	.50/c
18449	Fuse socket	.15
20014	Protective-lamp socket	.50

TUBULAR RESISTORS

FIVE-RESISTOR GROUP

Part No.	*Name of Part*	*List Price*
19649	1st-A. F. grid leak (black and purple)	.25
21784	2nd-A. F. grid resistor (gray & green)	.25
15545	2nd-detector bias resistor (maroon)	.25
16282	2nd-detector coupling resistor (blue and red)	.25
17118	Mounting bracket	.05
17117	Fibre resistor-pad	.25/c
17119	Metal clamping-strip	.02

THREE-RESISTOR GROUP

Part No.	*Name of Part*	*List Price*
19649	2nd-detector grid resistor (black and purple)	.25
16282	Oscillator grid leak (blue and red)	.25
15545	R. F. screen resistor (maroon)	.25
17341	Mounting bracket	.05
17342	Fibre resistor-pad	.25/c
17345	Metal clamping-strip	.02

December, 1931. THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST FOR MODEL 87-D (Continued)

MISCELLANEOUS PARTS

Part No.	*Name of Part*	*List Price*
15213	Tube shield	$ .15
15214	Tube-shield base	.03
16771	Tube-shield base rivet	.30/c
19566	110-volt cable and plug	1.90
20073	110-volt-cable instruction tag	.02
18897	110-volt plug (male)	.15
16741	110-volt cable bushing	.05
16742	Bushing retaining spring	.05
18363	Binding post base	.05
8215	Binding post	.20
13145	Binding-post insulating washer	.25/c
3419	Binding-post insulating bushing	$ .15/c
19547	Self-tapping screw (3/8″ long)	.02
18534	Line fuse (2 amperes)	.05
21108	Control-grid lead and cap	.15
22530	Fibre disc (1″ dia.) with two lugs used as a terminal block	.05
19869	Bottom plate	1.30
13989	Ground clamp assembly	.30
20075	Protective lamp (75 watts)	.35 net
21674	Instruction and log card (F-861)	.01 net
21779	Shipping container	.65 net

PARTS AND PRICE LIST FOR NO. 25000 SPEAKER IN MODEL 87-D

Part No.	*Name of Part*	*List Price*
20737	Diaphragm	$ 3.25
14382	Diaphragm-holding segment (3 used) per set	1.00
14394	Diaphragm-holding segment screw	.30/c
4795N	Diaphragm-spider screw	.30/c
19459	Diaphragm-spider washer (hex. metal)	.02
19471	Diaphragm-spider washer (fibre)	.30/c
20894	Diaphragm housing	2.50
19860	FIELD COIL	3.00
19458	Field-coil insulator	.02
19479	Field-coil washer, back (2 1/8″ dia.)	.50/c
20147	Field-coil washer, front (2 3/8″ dia. padded)	.05
19454	TOP-POLE PIECE	.65
19538	Top-pole-piece mounting screw	.03
14367	Top-pole-piece mounting nut	$ .02
24040	OUTPUT TRANSFORMER (less case)	3.00
21418	Output-transformer case	.40
21424	Output-transformer fibre insulator	.02
7697	Output-transformer mounting screw	.30/c
8188	Output-transformer mounting nut	.01

MISCELLANEOUS PARTS

Part No.	*Name of Part*	*List Price*
20657	Cable and plug assembly	1.65
18582	Plug only	.65
19508	Cable clamp	.05
18959	Cloth screen	1.00
20171	Gauge for centering voice coil (set of 3)	.10
20739	Shipping container	.35 net

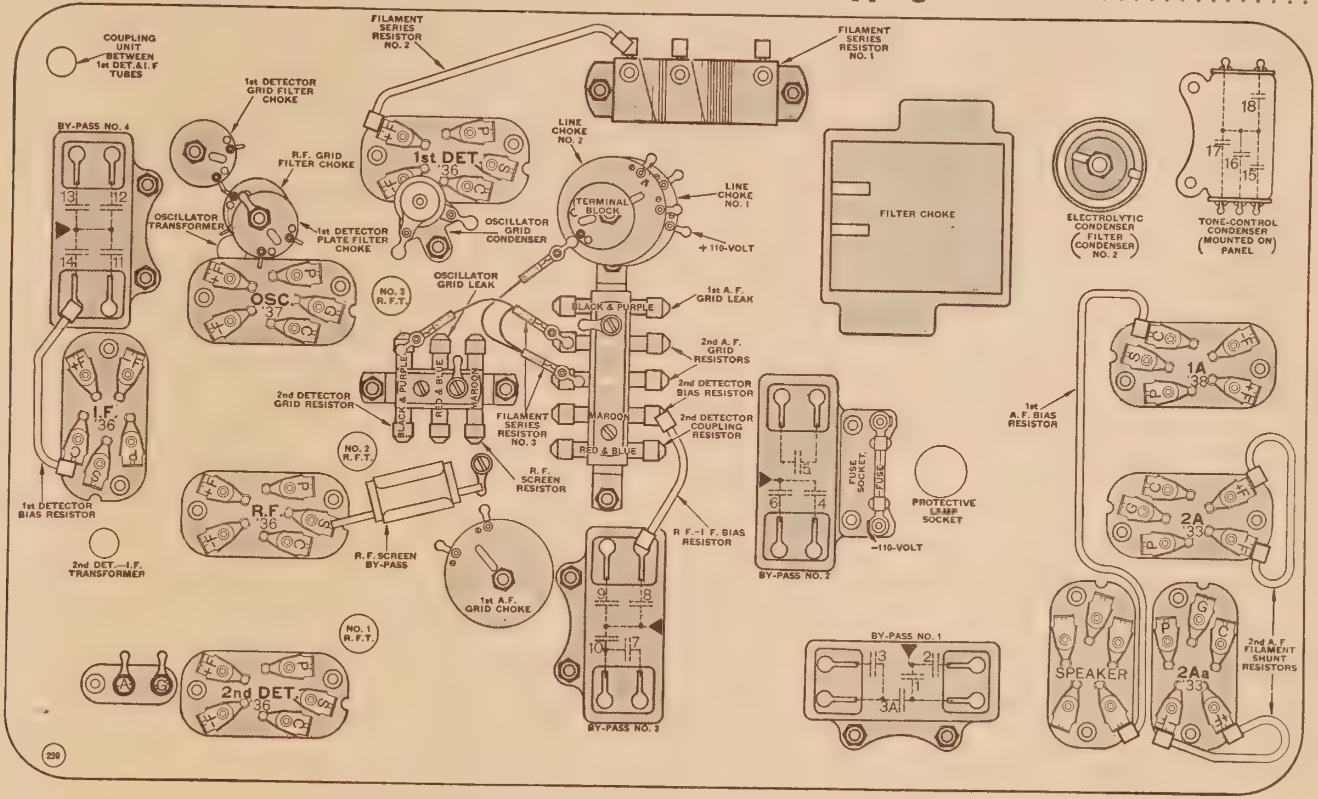

COUPLING UNIT BETWEEN 1st DET.& I. F TUBES
FILAMENT SERIES RESISTOR NO. 2
FILAMENT SERIES RESISTOR NO. 1
1st DETECTOR GRID FILTER CHOKE
BY-PASS NO. 4
13
12
14
11
R.F. GRID FILTER CHOKE
1st DET. '36
LINE CHOKE NO. 2
TERMINAL BLOCK
LINE CHOKE NO. 1
+ 110-VOLT
FILTER CHOKE
ELECTROLYTIC CONDENSER (FILTER CONDENSER NO. 2)
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
18
17
16
15
OSCILLATOR TRANSFORMER
1st DETECTOR PLATE FILTER CHOKE
OSCILLATOR GRID CONDENSER
OSC. '37
NO. 3 R.F.T.
OSCILLATOR GRID LEAK
BLACK & PURPLE
1st A.F. GRID LEAK
2nd A.F. GRID RESISTORS
2nd DETECTOR BIAS RESISTOR
2nd DETECTOR COUPLING RESISTOR
MAROON
RED & BLUE
2nd DETECTOR GRID RESISTOR
FILAMENT SERIES RESISTOR NO. 3
1A '38
1st A.F. BIAS RESISTOR
I.F. '36
1st DETECTOR BIAS RESISTOR
NO. 2 R.F.T.
R.F. SCREEN RESISTOR
R.F. '36
R.F. SCREEN BY-PASS
2nd DET.—I.F. TRANSFORMER
R F.–I F. BIAS RESISTOR
FUSE SOCKET
FUSE
6
4
5
PROTECTIVE LAMP SOCKET
–110-VOLT
BY-PASS NO. 2
2A '33
1st A.F. GRID CHOKE
9
8
10
7
NO. 1 R.F.T.
A
G
2nd DET. '36
BY-PASS NO. 3
BY-PASS NO. 1
3
2
1
3A
SPEAKER
2Aa '33
2nd A.F FILAMENT SHUNT RESISTORS
239

FIG. 324. CHART OF MODEL 87-D.
The 2nd-A. F. Grid resistors are colored gray and green.

By-pass Condensers in Model 87-D.

By-pass No. 1

1—Negative 110-volt line condenser.
2—I. F.-1st-detector screen by-pass.
3—Filter condenser No. 1.
3A—Ground coupling condenser.

By-pass No. 2

4—2nd-detector bias by-pass.
5—2nd-detector grid circuit by-pass.
6—Filter condenser No. 3.

By-pass No. 3

7—2nd-detector—1st-A. F. coupling condenser.
8—R. F.-I. F. bias by-pass.
9—2nd-detector screen by-pass.
10—Phone condenser.

By-pass No. 4

11—R. F. grid-circuit by-pass.
12—1st-detector plate filter condenser.
13—1st-detector—I. F. grid-circuit by-pass.
14—1st-detector bias by-pass.

Tone Control Condenser

15—Tone condenser.
16—Tone condenser.
17—Tone condenser.
18—Not used.

December, 1931. THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL 87-D

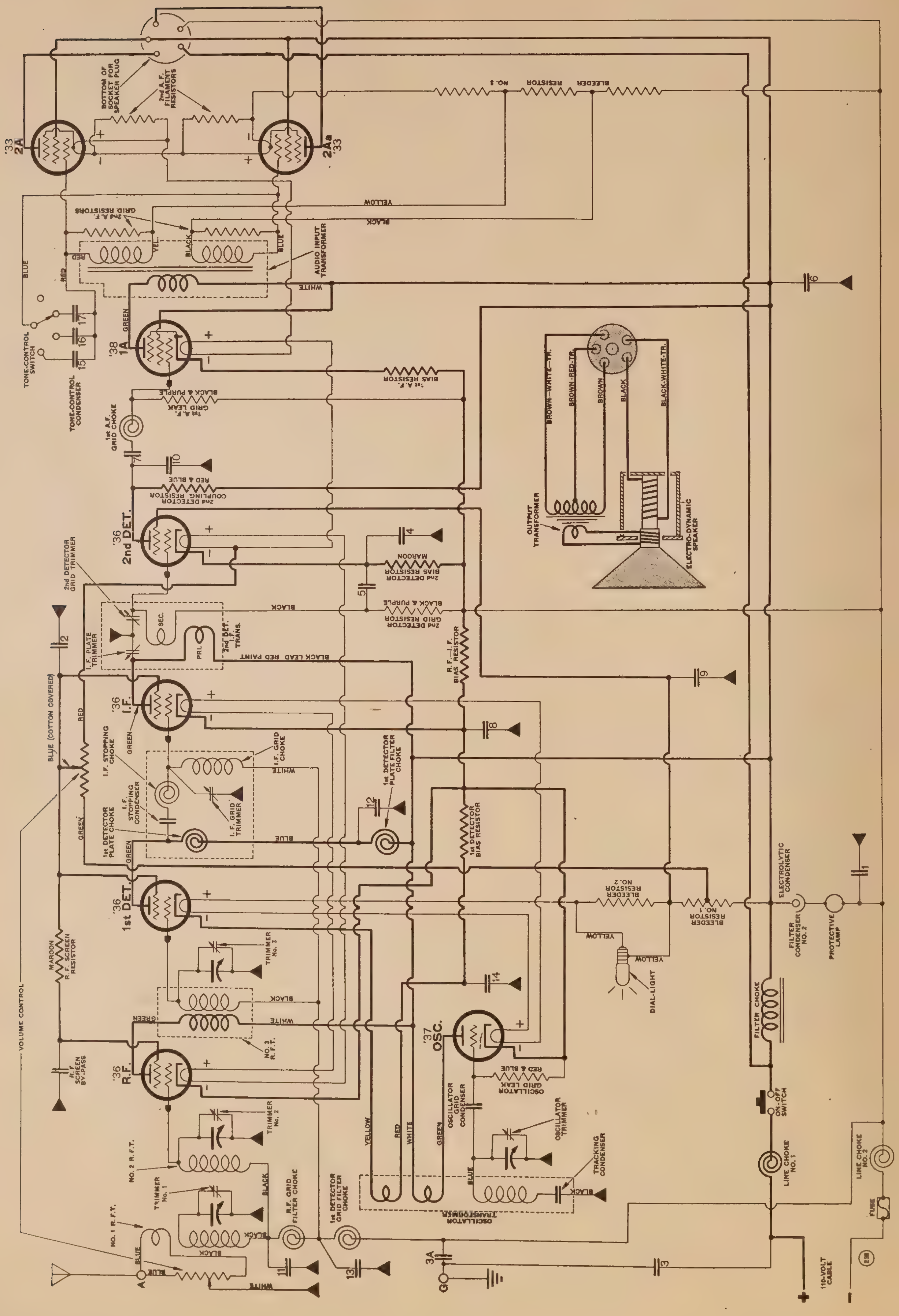

'33 2A
BOTTOM OF SOCKET FOR SPEAKER PLUG
2nd A.F. FILAMENT RESISTORS
2A '33
BLEEDER RESISTOR NO. 3
YELLOW
BLACK
2nd A.F. GRID RESISTORS
YEL.
BLACK
RED
BLUE
AUDIO INPUT TRANSFORMER
WHITE
6
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
15
16
17
GREEN
'38 1A
1st A.F. BIAS RESISTOR
BLACK & PURPLE
1st A.F. GRID LEAK
1st A.F. GRID CHOKE
7
10
RED & BLUE
2nd DETECTOR COUPLING RESISTOR
'36 2nd DET.
4
MAROON
2nd DETECTOR BIAS RESISTOR
5
BLACK & PURPLE
2nd DETECTOR GRID RESISTOR
2nd DETECTOR GRID TRIMMER
SEC.
PRI.
2nd DET. I.F. TRANS.
BLACK LEAD RED PAINT
I.F. PLATE TRIMMER
2
R.F.—I.F. BIAS RESISTOR
9
BROWN-WHITE-TR.
BROWN-RED-TR.
BROWN
BLACK
BLACK-WHITE-TR.
OUTPUT TRANSFORMER
ELECTRO-DYNAMIC SPEAKER
'36 I.F.
8
BLUE (COTTON COVERED)
I.F. STOPPING CHOKE
I.F. GRID CHOKE
I.F. STOPPING CONDENSER
I.F. GRID TRIMMER
1st DETECTOR PLATE FILTER CHOKE
12
1st DETECTOR PLATE CHOKE
1st DETECTOR BIAS RESISTOR
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
ELECTROLYTIC CONDENSER
1
'36 1st DET.
MAROON
R.F. SCREEN RESISTOR
TRIMMER No. 3
YELLOW
DIAL-LIGHT
FILTER CONDENSER NO. 2
PROTECTIVE LAMP
14
No. 3 R.F.T.
VOLUME CONTROL
FILTER CHOKE
'37 OSC.
'36 R.F.
R.F. SCREEN BY-PASS
RED & BLUE
OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
TRIMMER No. 2
No. 2 R.F.T.
ON-OFF SWITCH
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
YELLOW
RED
WHITE
GREEN
LINE CHOKE NO. 1
LINE CHOKE NO. 2
FUSE
TRIMMER No. 1
R.F. GRID FILTER CHOKE
1st DETECTOR GRID FILTER CHOKE
No. 1 R.F.T.
A
G
3A
3
11
13
110-VOLT CABLE
+
−
238

FIG. 325. DIAGRAM OF MODEL 87-D.

The 2nd-A. F. grid resistors are colored gray and green.

Copyright, 1931, by Atwater Kent Mfg. Co.

ATWATER KENT RADIO

SERVICE DATA
WITH
PARTS AND PRICE LIST FOR
MODELS 81, 81-B, 81-C, 82-D, 82-Q, 85-Q, 86, 87 AND 89 (Late Types)
AND
MODELS 90, 90-F, 92, 92-F, 93, 94, 94-F, 96, 96-F, 99, 99-F AND 99-P

TABULATED DATA FOR MODELS DESCRIBED IN THIS SUPPLEMENT

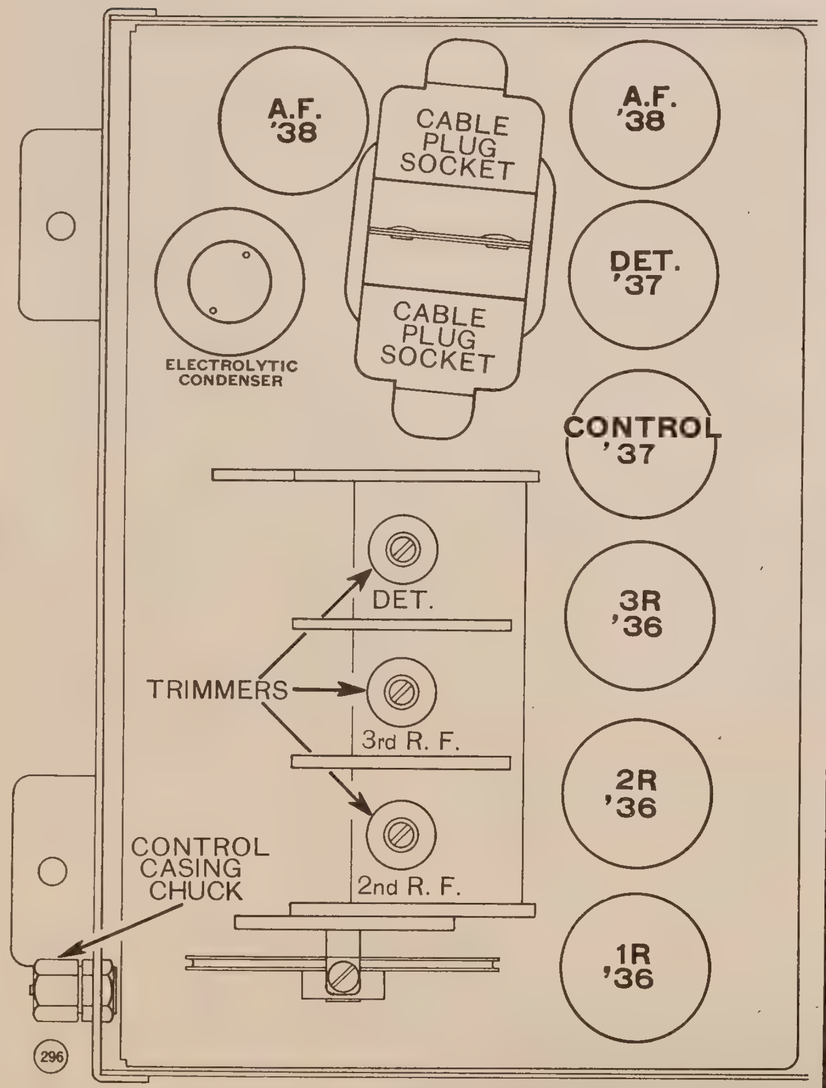
All receivers described in this supplement, with the exception of Model 81, 81-B, and 81-C, employ the super-heterodyne circuit with an intermediate frequency of 130 kilocycles. The intermediate frequency of Model 93 short-wave converter is 1000 kilocycles.

Model No.	Power Supply	Chassis Serial Nos.	Part No. Complete	Part No. Chassis	Part No. Speaker	Neon Tuning Light	Automatic Vol. Control	Tone Control	Local-Distance Switch	TUBES								
										R.F.	1st Det.	I.F.	2nd Det.	1st A.F.	2nd A.F.	Osc.	Control Tube	Rect.
81	Battery	All	20300	22750	22600	No	Yes	No	No	36(3)	37	—	—	38(2)	—	—	37	—
81-B	Battery	All	25600	24190	22600	No	Yes	No	No	36(3)	37	—	—	38(2)	—	—	37	—
81-C	Battery	All	25700	24190	22600	No	Yes	No	No	36(3)	37	—	—	38(2)	—	—	37	—
82-D 2nd Type	110-Volt D. C.	Above 5760301	21800	26170	18600	No	No	Yes	No	—	36	36	36	37	33	37	—	—
82-Q 2nd Type	Battery	Above 2550940	21900	25480	18400	No	Yes	Yes	Yes	32	32	32	32	30	33	30	—	—
85-Q 2nd Type	Battery	Above 163767	22200	22200C	19900	No	Yes	Yes	Yes	32	32	32	32	30	33	30	—	—
86 2nd Type	110-Volt 60-Cycle	Above 5876861	23000	23000C	24600	No	Yes	Yes	Yes	35	35	35	24	47	—	27	24	80
86-F 2nd Type	110-Volt 25-Cycle	Above 7168925	24700	24700C	24600	No	Yes	Yes	Yes	35	35	35	24	47	—	27	24	80
87 3rd Type	110-Volt 60-Cycle	Above 2525871	21200	21200C	19800	No	No	Yes	Yes	35	35	35	27	27	47(2)	27	—	80
89 3rd Type	110-Volt 60-Cycle	Above 6755181	21300	21300C	19800	No	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
89-F 3rd Type	110-Volt 25-Cycle	Above 1585395	22400	22400C	19800	No	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
89-P 3rd Type	110-Volt 60-Cycle	Above 1935904	20000	20000C	19800	No	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
90	110V., 60C.	All	25800	24320	17300	No	No	Yes	No	35	35	35	24	47	—	27	—	80
90-F	110V., 25C.	All	26500	25110	17300	No	No	Yes	No	35	35	35	24	47	—	27	—	80
92	110V., 60C.	All	25900	24330	17300	No	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
92-F	110V., 25C.	All	26600	25120	17300	No	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
93	110-Volt 25 to 60-C.	All	27200	25430	———	No	No	No	No	—	24	27	—	—	—	27	—	80
94	110V., 60C.	All	26000	26000C	26300	No	No	Yes	No	35	35	35	24	47	—	27	—	80
94-F	110V., 25C.	All	26700	26700C	26300	No	No	Yes	No	35	35	35	24	47	—	27	—	80
96 1st Type	110-Volt 60-Cycle	Below 7289385	26100	26100C	26300	Yes	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
96 2nd Type	110-Volt 60-Cycle	7289385 to 7291674	26100	26100C	26300	Yes	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
96 3rd Type	110-Volt 60-Cycle	Above 7291674	26100	26100C	26300	Yes	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
96-F	110V., 25C.	All	26800	26800C	26300	Yes	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
99 1st Type	110-Volt 60-Cycle	Below 4882380	26200	26200C	26400	Yes	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
99 2nd Type	110-Volt 60-Cycle	4882380 to 4884901	26200	26200C	26400	Yes	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
99 3rd Type	110-Volt 60-Cycle	Above 4884901	26200	26200C	26400*	Yes	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
99-F	110V., 25C.	All	26900	26900C	26400	Yes	Yes	Yes	Yes	35	35	35	27	27	47(2)	27	24	80
99-P	110V., 60C.	All	27400	27400C	26400*	Yes	Yes	Yes	No	35	35	35	27	27	47(2)	27	24	80

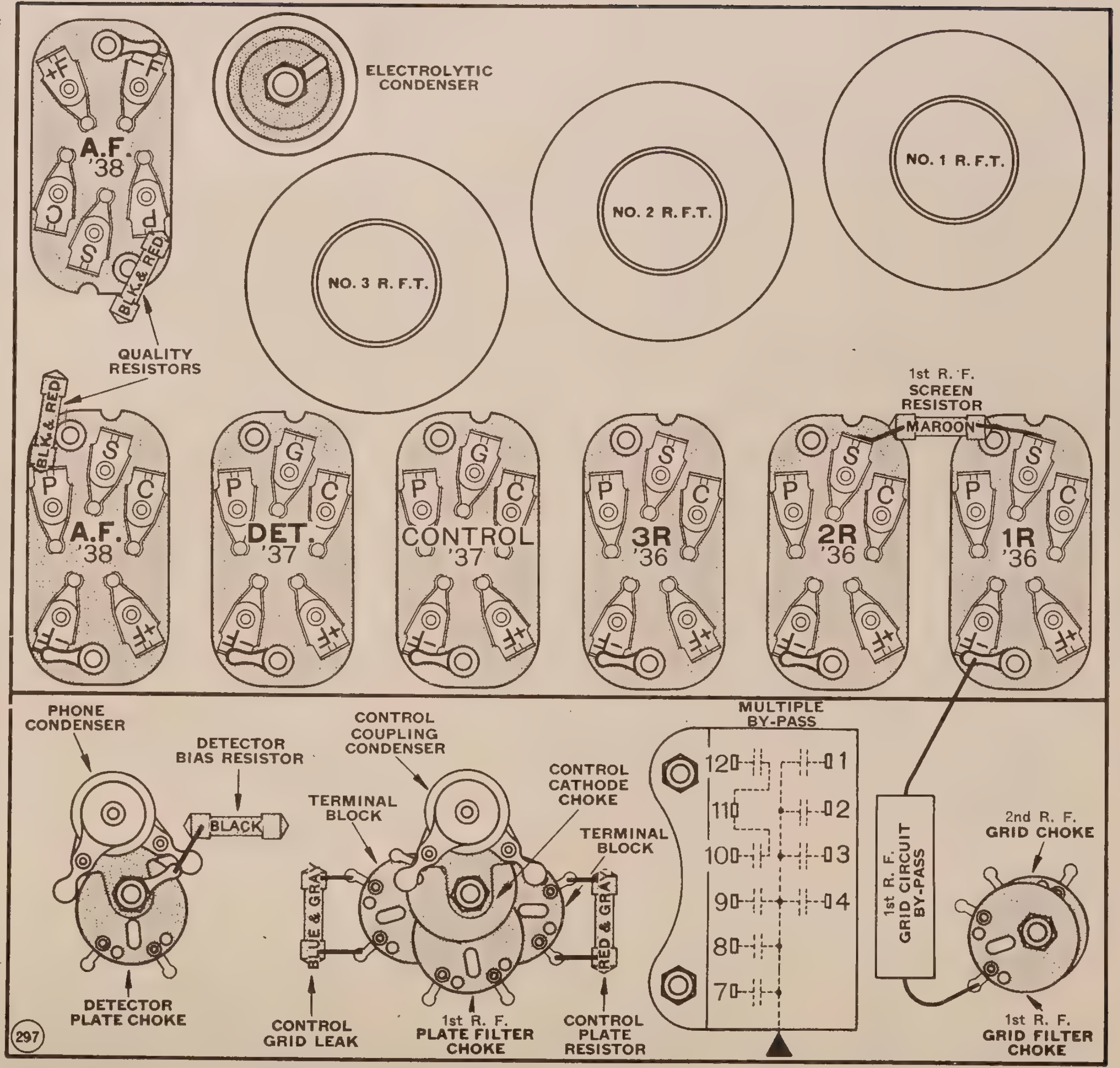
*In Model 99-P and the 3rd type of Model 99, the field coil resistance is higher than in the early types of Model 99. The speaker plug and socket are colored green for identification.

MODEL 81, 81-B, 81-C MOTOR CAR RADIO

Top View.

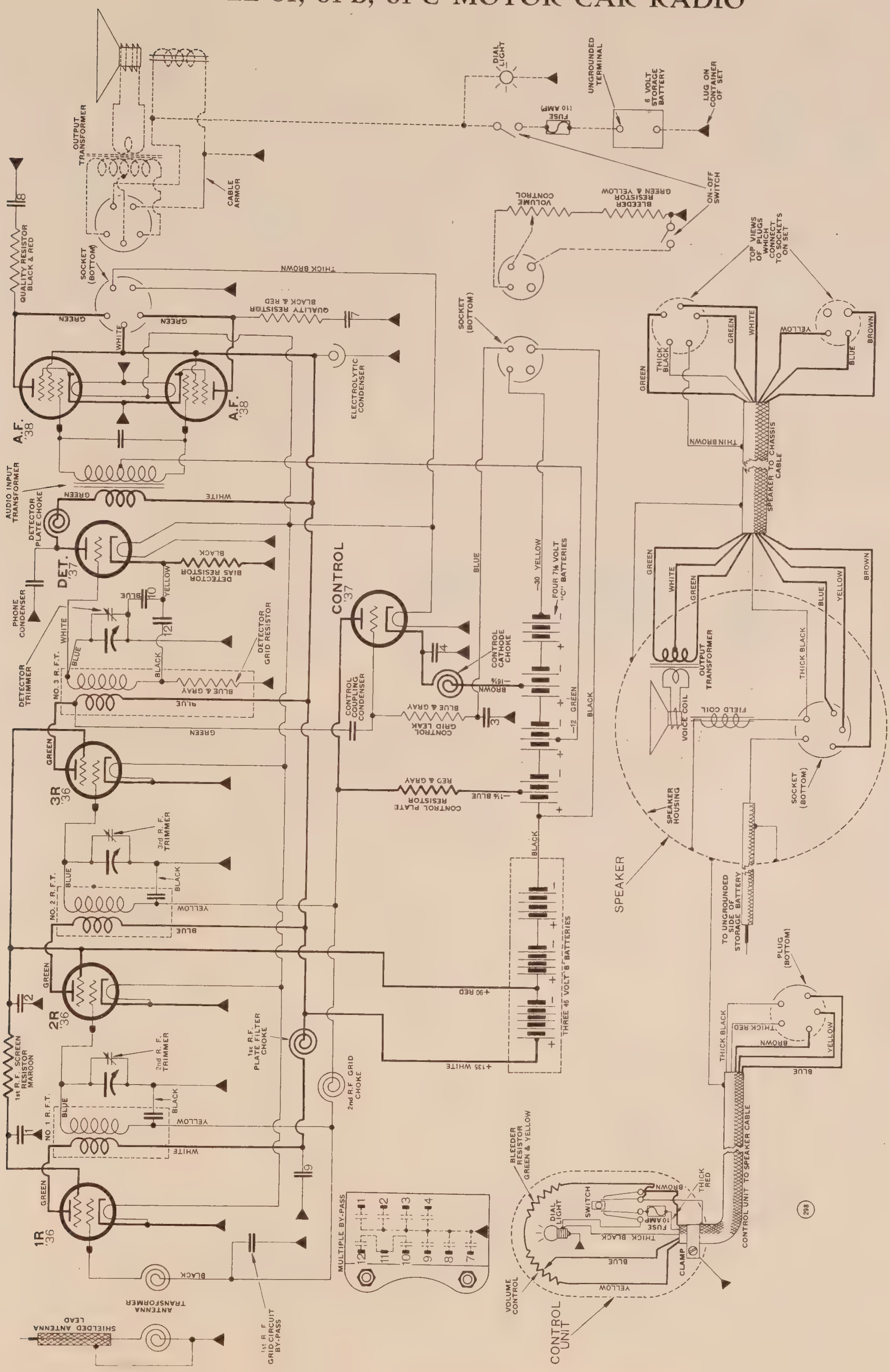

A.F. '38
CABLE PLUG SOCKET
CABLE PLUG SOCKET
ELECTROLYTIC CONDENSER
A.F. '38
DET. '37
CONTROL '37
3R '36
2R '36
1R '36
DET.
TRIMMERS
3rd R. F.
2nd R. F.
CONTROL CASING CHUCK
296

Bottom Chart.


ELECTROLYTIC CONDENSER
NO. 1 R.F.T.
NO. 2 R.F.T.
NO. 3 R.F.T.
A.F. '38
BLK.& RED
QUALITY RESISTORS
1st R. F. SCREEN RESISTOR
MAROON
A.F. '38
DET. '37
CONTROL '37
3R '36
2R '36
1R '36
P
G
S
C
+F
-F
PHONE CONDENSER
DETECTOR BIAS RESISTOR
BLACK
CONTROL COUPLING CONDENSER
TERMINAL BLOCK
CONTROL CATHODE CHOKE
TERMINAL BLOCK
MULTIPLE BY-PASS
120
110
100
90
80
70
01
02
03
04
1st R. F. GRID CIRCUIT BY-PASS
2nd R. F. GRID CHOKE
BLUE & GRAY
RED & GRAY
DETECTOR PLATE CHOKE
CONTROL GRID LEAK
1st R. F. PLATE FILTER CHOKE
CONTROL PLATE RESISTOR
1st R. F. GRID FILTER CHOKE
297

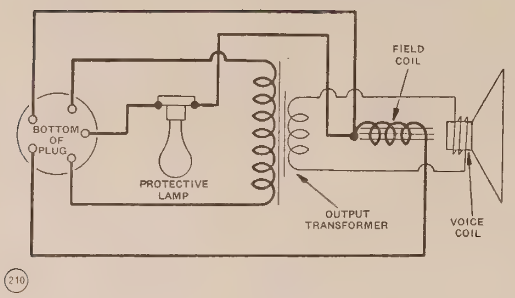
Complete installation instructions are furnished with each Atwater Kent Motor Car receiver. The instructions also contain complete information regarding the suppression of ignition interference.

MODEL 81, 81-B, 81-C MOTOR CAR RADIO


OUTPUT TRANSFORMER
CABLE ARMOR
DIAL LIGHT
UNGROUNDED TERMINAL
6 VOLT STORAGE BATTERY
LUG ON CONTAINER OF SET
FUSE (10 AMP)
ON-OFF SWITCH
VOLUME CONTROL
BLEEDER RESISTOR GREEN & YELLOW
QUALITY RESISTOR BLACK & RED
SOCKET (BOTTOM)
THICK BROWN
GREEN
WHITE
8
7
A.F. '38
A.F. '38
ELECTROLYTIC CONDENSER
AUDIO INPUT TRANSFORMER
DETECTOR PLATE CHOKE
PHONE CONDENSER
DET. '37
DETECTOR BIAS RESISTOR
BLACK
YELLOW
BLUE
10
12
DETECTOR TRIMMER
DETECTOR GRID RESISTOR
BLUE & GRAY
NO. 3 R.F.T.
CONTROL '37
CONTROL CATHODE CHOKE
CONTROL COUPLING CONDENSER
CONTROL GRID LEAK
CONTROL PLATE RESISTOR RED & GRAY
4
3
BROWN
−16½
−30 YELLOW
FOUR 7½ VOLT "C" BATTERIES
−12 GREEN
−1½ BLUE
3R '36
3rd R.F. TRIMMER
NO. 2 R.F.T.
2R '36
2
+90 RED
+135 WHITE
THREE 45 VOLT "B" BATTERIES
1st R.F. PLATE FILTER CHOKE
2nd R.F. GRID CHOKE
2nd R.F. TRIMMER
1st R.F. SCREEN RESISTOR MAROON
NO. 1 R.F.T.
1
9
1R '36
MULTIPLE BY-PASS
12 11 10 9 8 7
1 2 3 4
ANTENNA TRANSFORMER
SHIELDED ANTENNA LEAD
1st R.F. GRID CIRCUIT BY-PASS
TOP VIEWS OF PLUGS WHICH CONNECT TO SOCKETS ON SET
THICK BLACK
THIN BROWN
SPEAKER TO CHASSIS CABLE
VOICE COIL
FIELD COIL
SPEAKER HOUSING
SPEAKER
TO UNGROUNDED SIDE OF STORAGE BATTERY
PLUG (BOTTOM)
THICK RED
CONTROL UNIT TO SPEAKER CABLE
BLEEDER RESISTOR GREEN & YELLOW
SWITCH
FUSE 10 AMP
CLAMP
VOLUME CONTROL
CONTROL UNIT
298

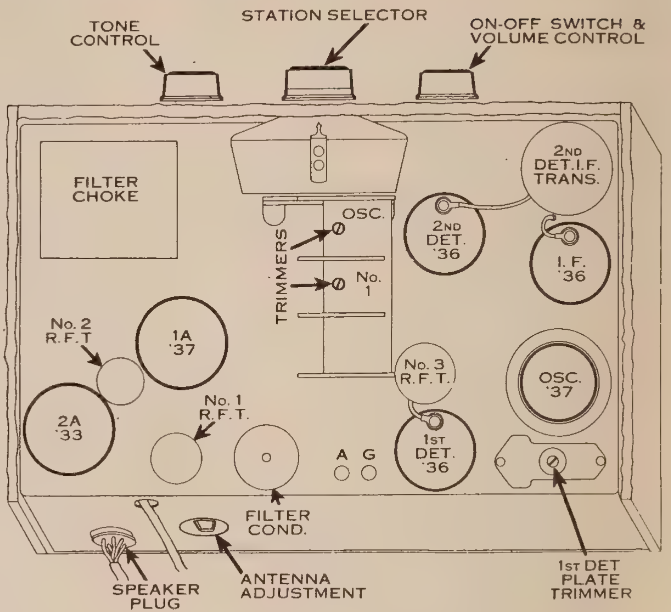
Model 81 receiver consists of three units; (1st) the chassis and battery container, (2nd) the electro-dynamic speaker, (3rd) the remote-control unit. Model 81-B and 81-C have separate containers for the chassis and "B" batteries. The "C" batteries are mounted in the chassis container in Model 81-B and 81-C. The dimensions of the chassis and battery containers are shown on page 364.

MODEL 82-D (2nd Type) Above Serial No. 5760301

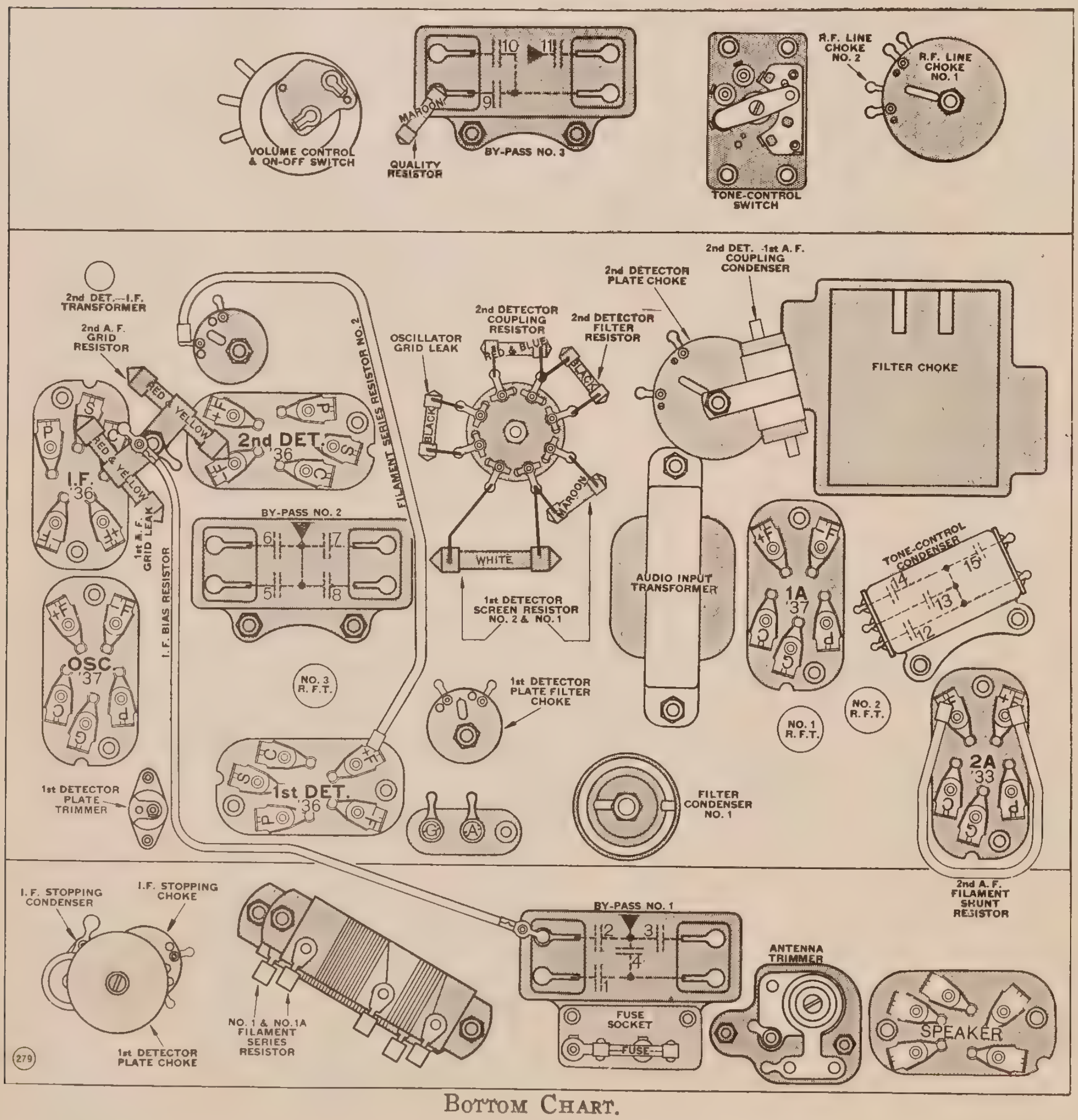

FIELD COIL
BOTTOM OF PLUG
PROTECTIVE LAMP
OUTPUT TRANSFORMER
VOICE COIL
210

Circuit of Speaker Used in Model 82-D.

The protective lamp (75 watts) is connected in series with the electrolytic filter condenser in the chassis. If the 110-volt D. C. supply plug is reversed, the lamp will light. When the 110-volt plug is properly inserted, the lamp does not light. This action is due to the fact that the electrolytic condenser passes current if the polarity of the applied D. C. voltage is not correct.


TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH & VOLUME CONTROL
FILTER CHOKE
OSC.
TRIMMERS
No. 1
2ND DET.I.F. TRANS.
2ND DET. '36
I. F. '36
No. 2 R.F.T.
1A '37
2A '33
No. 1 R.F.T.
No. 3 R.F.T.
OSC. '37
1ST DET. '36
A G
FILTER COND.
SPEAKER PLUG
ANTENNA ADJUSTMENT
1ST DET PLATE TRIMMER

Top View.


VOLUME CONTROL & ON-OFF SWITCH
MAROON
QUALITY RESISTOR
10
11
9
BY-PASS NO. 3
TONE-CONTROL SWITCH
R.F. LINE CHOKE NO. 2
R.F. LINE CHOKE NO. 1
2nd DET.—I.F. TRANSFORMER
2nd A. F. GRID RESISTOR
RED & YELLOW
2nd DET. '36
I.F. '36
1st A. F. GRID LEAK
I. F. BIAS RESISTOR
FILAMENT SERIES RESISTOR NO. 2
OSCILLATOR GRID LEAK
2nd DETECTOR COUPLING RESISTOR
RED & BLUE
2nd DETECTOR FILTER RESISTOR
BLACK
2nd DETECTOR PLATE CHOKE
2nd DET. -1st A. F. COUPLING CONDENSER
FILTER CHOKE
BY-PASS NO. 2
6
7
5
8
WHITE
1st DETECTOR SCREEN RESISTOR NO. 2 & NO. 1
AUDIO INPUT TRANSFORMER
1A '37
TONE-CONTROL CONDENSER
14
15
13
12
OSC. '37
NO. 3 R.F.T.
1st DETECTOR PLATE FILTER CHOKE
NO. 1 R.F.T.
NO. 2 R.F.T.
2A '33
1st DETECTOR PLATE TRIMMER
1st DET. '36
G
A
FILTER CONDENSER NO. 1
2nd A. F. FILAMENT SHUNT RESISTOR
I. F. STOPPING CONDENSER
I.F. STOPPING CHOKE
BY-PASS NO. 1
2
3
4
1
ANTENNA TRIMMER
NO. 1 & NO. 1A FILAMENT SERIES RESISTOR
FUSE SOCKET
FUSE
SPEAKER
279
1st DETECTOR PLATE CHOKE

Bottom Chart.

By-pass Condensers

By-pass No. 1

1—Ground coupling condenser.
2—Negative 110-volt line by-pass.
3—Not used.
4—1st-detector grid filter condenser.

By-pass No. 2

5—1st-detector screen by-pass.
6—1st-detector plate filter condenser.
7—Filter condenser No. 2.
8—I. F. screen by-pass.

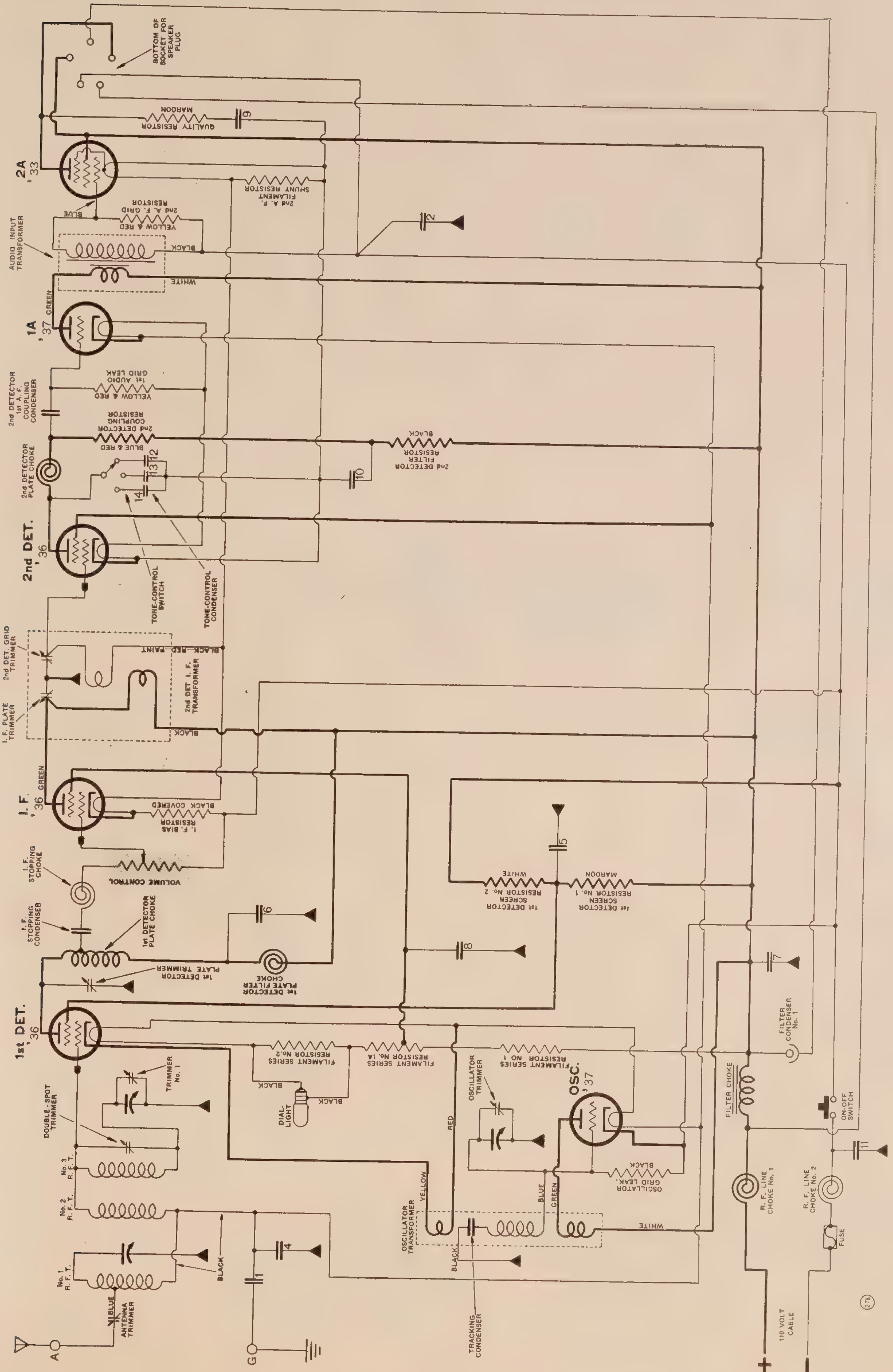
By-pass No. 3

9—Quality condenser.
10—2nd-detector plate filter condenser.
11—Negative 110-volt line by-pass

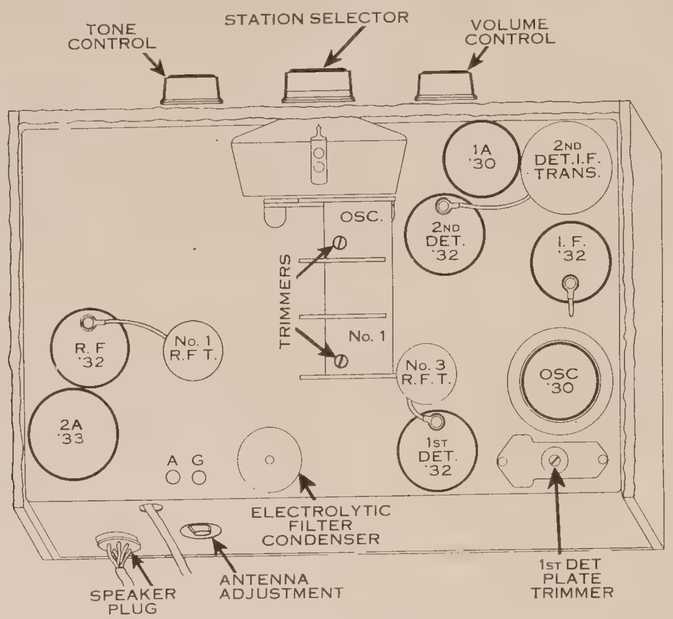
Tone-Control Condenser

12—Tone-control condenser.
13—Tone-control condenser.
14—Tone-control condenser.
15—Not used.

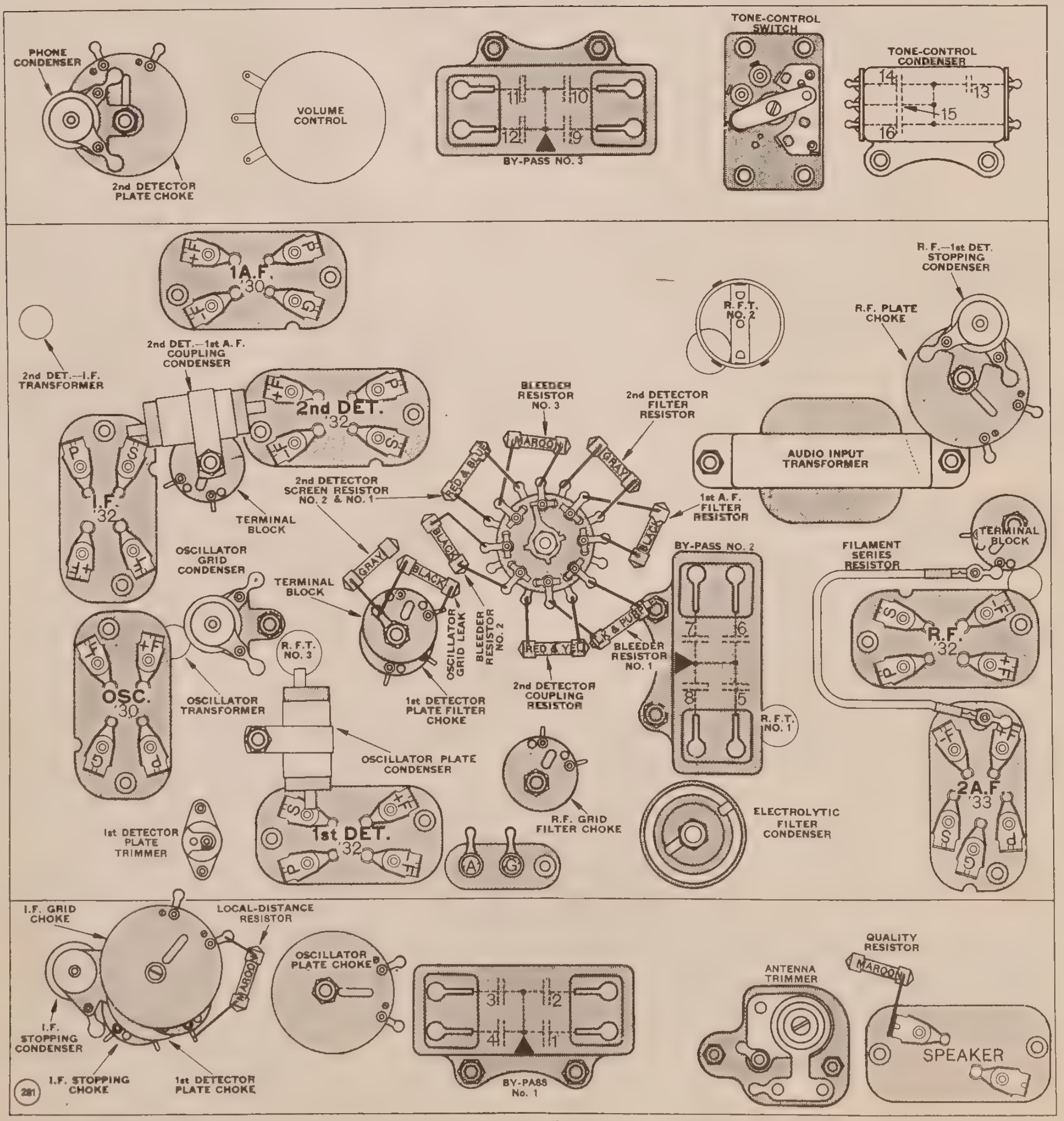
MODEL 82-D (2nd Type) Above Serial No. 5760301


BOTTOM OF SOCKET FOR SPEAKER PLUG
MAROON
QUALITY RESISTOR
9
2A
'33
2nd A. F. FILAMENT SHUNT RESISTOR
2nd A. F. GRID RESISTOR
YELLOW & RED
BLUE
AUDIO INPUT TRANSFORMER
BLACK
WHITE
2
1A
'37
GREEN
1st AUDIO GRID LEAK
YELLOW & RED
2nd DETECTOR 1st A. F. COUPLING CONDENSER
2nd DETECTOR COUPLING RESISTOR
BLUE & RED
BLACK
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR PLATE CHOKE
12
13
14
10
2nd DET.
'36
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
2nd DET. GRID TRIMMER
BLACK-RED-PAINT
2nd DET I. F. TRANSFORMER
I. F. PLATE TRIMMER
BLACK
I. F.
'36
GREEN
BLACK COVERED
I. F. BIAS RESISTOR
I. F. STOPPING CHOKE
VOLUME CONTROL
I. F. STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
6
1st DETECTOR PLATE TRIMMER
1st DETECTOR PLATE FILTER CHOKE
5
WHITE
1st DETECTOR SCREEN RESISTOR No. 2
MAROON
1st DETECTOR SCREEN RESISTOR No. 1
8
7
FILTER CONDENSER No. 1
1st DET.
'36
FILAMENT SERIES RESISTOR No. 2
FILAMENT SERIES RESISTOR No. 1A
FILAMENT SERIES RESISTOR NO. 1
BLACK
BLACK
DIAL-LIGHT
TRIMMER No. 1
DOUBLE-SPOT TRIMMER
OSCILLATOR TRIMMER
RED
OSC.
'37
FILTER CHOKE
ON-OFF SWITCH
11
BLACK
OSCILLATOR GRID LEAK
No. 3 R. F. T.
No. 2 R. F. T.
No. 1 R. F. T.
YELLOW
BLUE
GREEN
WHITE
OSCILLATOR TRANSFORMER
BLACK
TRACKING CONDENSER
R. F. LINE CHOKE No. 1
R. F. LINE CHOKE No. 2
FUSE
BLACK
4
1
BLUE
ANTENNA TRIMMER
A
G
110 VOLT CABLE
+
−
273

MODEL 82-Q (2nd Type) Above Serial No. 2550940


TONE CONTROL
STATION SELECTOR
VOLUME CONTROL
1A '30
2ND DET. I.F. TRANS.
OSC.
2ND DET. '32
I.F. '32
TRIMMERS
No. 1
R.F '32
No. 1 R.F.T.
No. 3 R.F.T.
OSC '30
2A '33
A G
1ST DET. '32
ELECTROLYTIC FILTER CONDENSER
SPEAKER PLUG
ANTENNA ADJUSTMENT
1ST DET PLATE TRIMMER

Top View.


PHONE CONDENSER
2nd DETECTOR PLATE CHOKE
VOLUME CONTROL
11 10 12 9
BY-PASS NO. 3
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
14 13 15 16
1A.F. '30
P G +F −F
2nd DET.—I.F. TRANSFORMER
2nd DET.—1st A. F. COUPLING CONDENSER
2nd DET. '32
I.F. '32
TERMINAL BLOCK
OSCILLATOR GRID CONDENSER
2nd DETECTOR SCREEN RESISTOR NO. 2 & NO. 1
BLEEDER RESISTOR NO. 3
MAROON
RED & BLUE
GRAY
BLACK
2nd DETECTOR FILTER RESISTOR
1st A. F. FILTER RESISTOR
TERMINAL BLOCK
OSCILLATOR GRID LEAK
BLEEDER RESISTOR NO. 2
RED & YEL
BLK & PURP
BLEEDER RESISTOR NO. 1
2nd DETECTOR COUPLING RESISTOR
1st DETECTOR PLATE FILTER CHOKE
R.F.T. NO. 2
R.F. PLATE CHOKE
R. F.—1st DET. STOPPING CONDENSER
AUDIO INPUT TRANSFORMER
BY-PASS NO. 2
7 6 8 5
R.F.T. NO. 1
FILAMENT SERIES RESISTOR
TERMINAL BLOCK
R.F. '32
OSC. '30
OSCILLATOR TRANSFORMER
R.F.T. NO. 3
OSCILLATOR PLATE CONDENSER
1st DETECTOR PLATE TRIMMER
1st DET. '32
R.F. GRID FILTER CHOKE
A G
ELECTROLYTIC FILTER CONDENSER
2A.F. '33
I.F. GRID CHOKE
LOCAL-DISTANCE RESISTOR
OSCILLATOR PLATE CHOKE
I.F. STOPPING CONDENSER
I.F. STOPPING CHOKE
1st DETECTOR PLATE CHOKE
3 2 4 1
BY-PASS No. 1
ANTENNA TRIMMER
QUALITY RESISTOR
SPEAKER
281

Bottom Chart.

By-pass Condensers

By-pass No. 1

1—2nd-detector screen by-pass.
2—R. F. grid filter condenser.
3—1st-detector screen by-pass.
4—1st-detector plate filter condenser.

By-pass No. 2

5—+B by-pass.
6—1st-detector—I. F. grid filter condenser.
7—2nd-detector grid-circuit by-pass.
8—R. F.—I. F. screen by-pass.

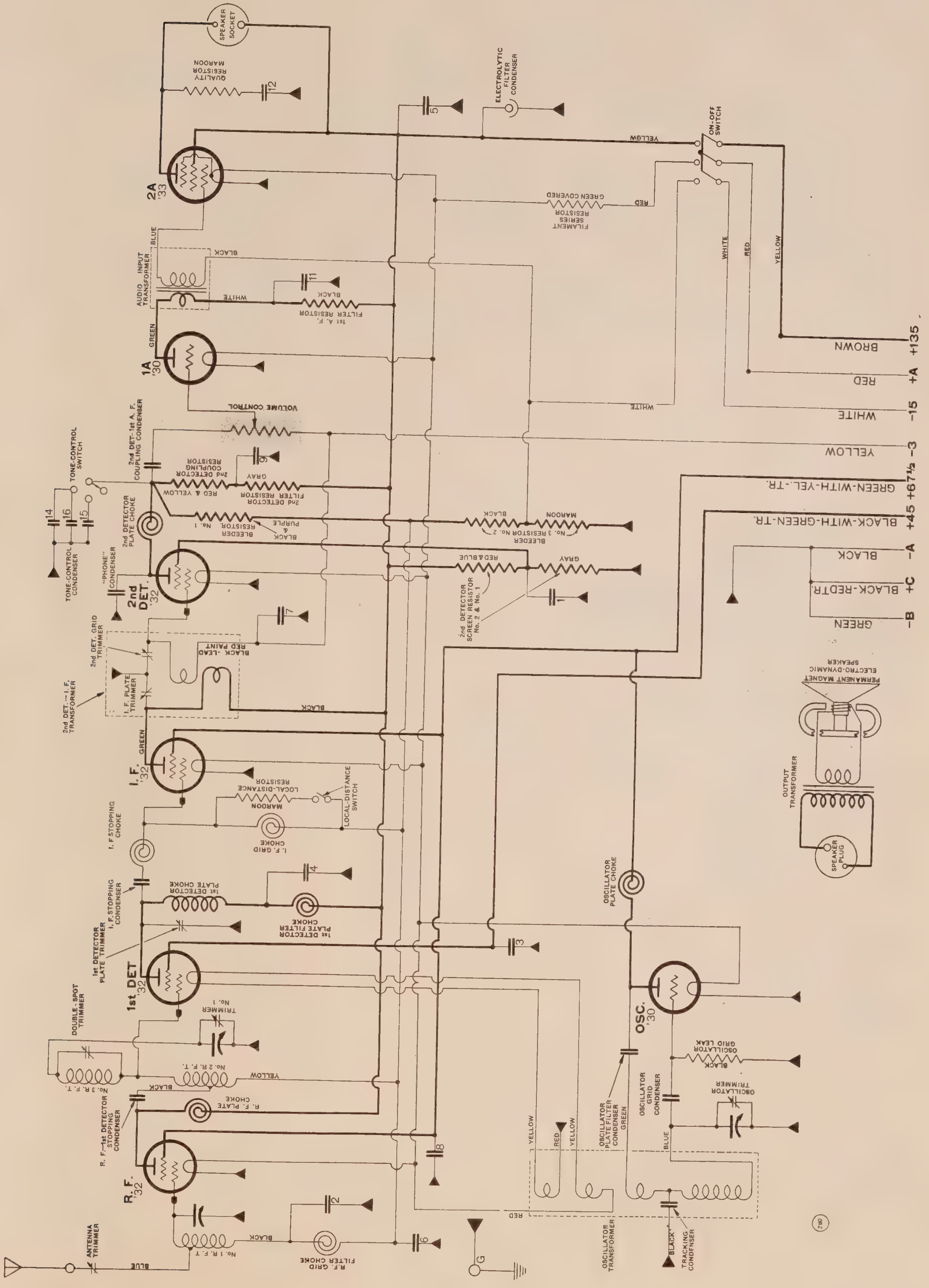
By-pass No. 3

9—2nd-detector plate filter condenser.
10—Not used.
11—1st-A. F. plate filter condenser.
12—Quality condenser.

Tone-control Condenser

13—Not used.
14—Tone-control condenser.
15—Tone-control condenser.
16—Tone-control condenser.

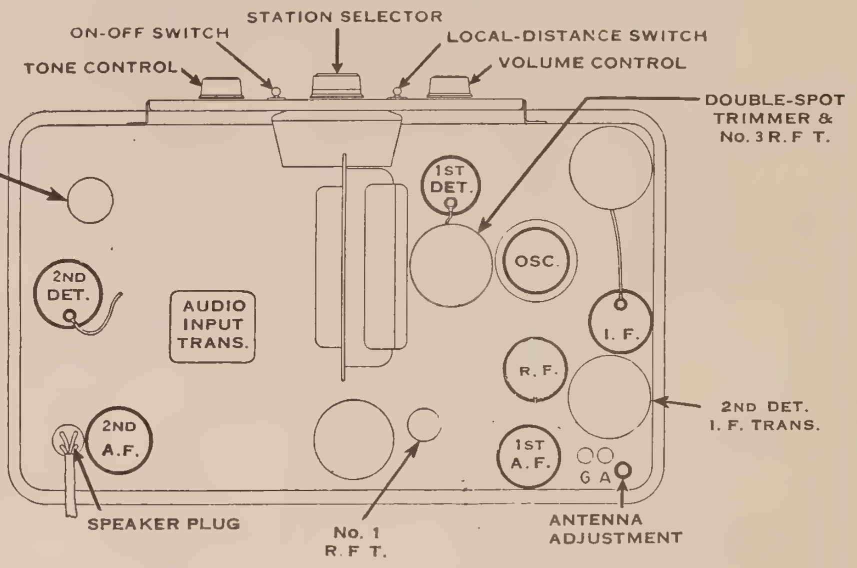
MODEL 82-Q (2nd Type) Above Serial No. 2550940


SPEAKER SOCKET
QUALITY RESISTOR MAROON
12
2A '33
ELECTROLYTIC FILTER CONDENSER
5
ON-OFF SWITCH
YELLOW
FILAMENT SERIES RESISTOR GREEN COVERED
RED
WHITE
RED
YELLOW
AUDIO INPUT TRANSFORMER
BLUE
BLACK
WHITE
11
1st A. F. FILTER RESISTOR BLACK
GREEN
1A '30
VOLUME CONTROL
WHITE
BROWN +135
RED +A
WHITE -15
YELLOW -3
GREEN-WITH-YEL.-TR. +67½
BLACK-WITH-GREEN-TR. +45
BLACK -A
BLACK-RED-TR. +C
GREEN -B
2nd DET.-1st A. F. COUPLING CONDENSER
2nd DETECTOR COUPLING RESISTOR
9
GRAY
RED & YELLOW
2nd DETECTOR FILTER RESISTOR
TONE-CONTROL SWITCH
14
16
15
TONE-CONTROL CONDENSER
2nd DETECTOR PLATE CHOKE
BLEEDER RESISTOR No. 1
PURPLE & BLACK
BLACK
MAROON
No. 3 RESISTOR No. 2 BLEEDER
RED & BLUE
GRAY
2nd DETECTOR SCREEN RESISTOR No. 2 & No. 1
1
"PHONE" CONDENSER
2nd DET. '32
7
2nd DET. GRID TRIMMER
RED PAINT BLACK-LEAD
2nd DET.-I. F. TRANSFORMER
I. F. PLATE TRIMMER
BLACK
GREEN
I. F. '32
LOCAL-DISTANCE RESISTOR
MAROON
LOCAL-DISTANCE SWITCH
I. F. STOPPING CHOKE
I. F. GRID CHOKE
1st DETECTOR PLATE CHOKE
4
1st DETECTOR PLATE FILTER CHOKE
I. F. STOPPING CONDENSER
1st DETECTOR PLATE TRIMMER
3
1st DET '32
DOUBLE-SPOT TRIMMER
TRIMMER No. 1
No. 3 R. F. T.
No. 2 R. F. T.
YELLOW
BLACK
R. F. PLATE CHOKE
R. F.-1st DETECTOR STOPPING CONDENSER
8
R. F. '32
2
BLACK
No. 1 R. F. T.
R. F. GRID FILTER CHOKE
6
ANTENNA TRIMMER
BLUE
G
PERMANENT MAGNET ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
OSCILLATOR PLATE CHOKE
OSC. '30
OSCILLATOR GRID LEAK BLACK
OSCILLATOR TRIMMER
OSCILLATOR GRID CONDENSER
OSCILLATOR PLATE FILTER CONDENSER
GREEN
BLUE
YELLOW
RED
YELLOW
RED
OSCILLATOR TRANSFORMER
BLACK
TRACKING CONDENSER
280

MODEL 85-Q (2nd Type) Above Serial No. 163767

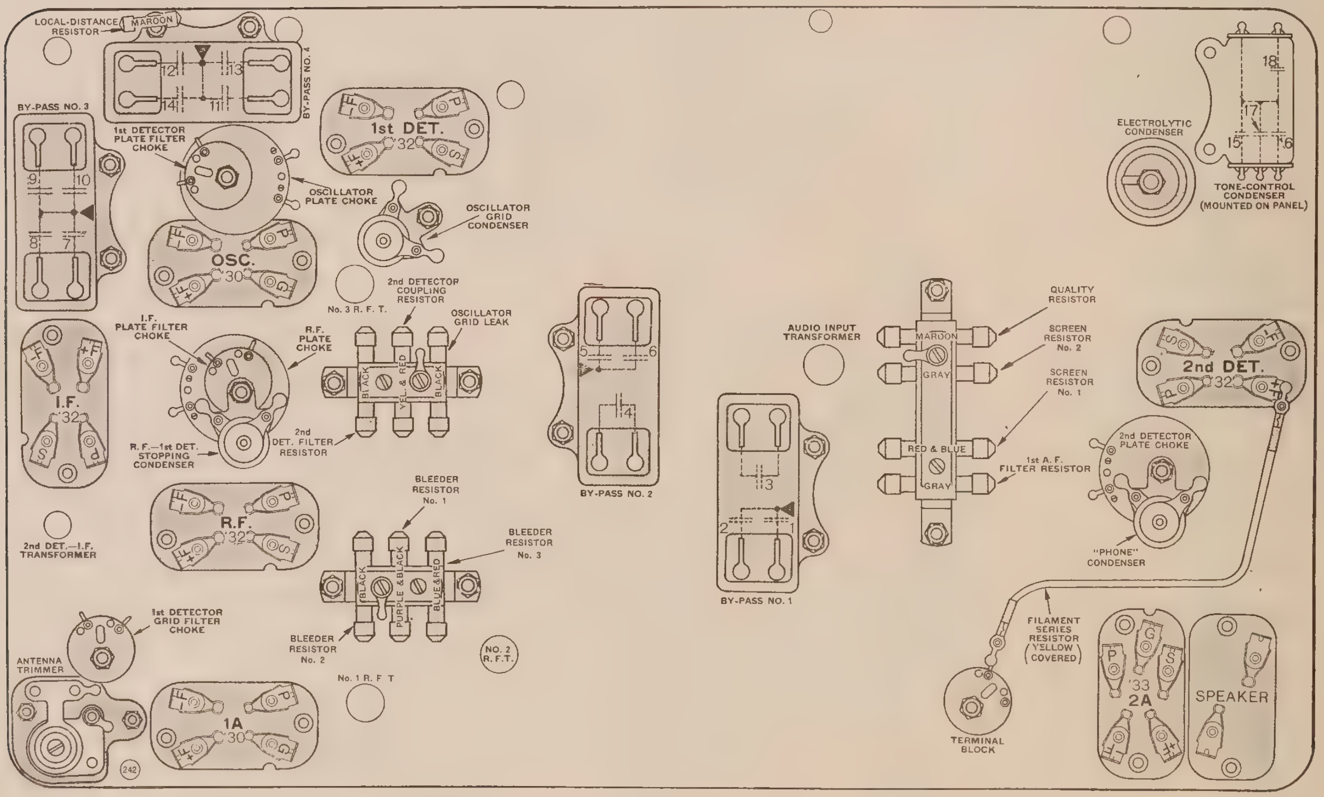
TUBES

R. F = '32
1st Det. = '32
I. F. = '32
2nd Det. = '32
1st A. F. = '30
2nd A. F. = '33
Osc. = '30


STATION SELECTOR
ON-OFF SWITCH
LOCAL-DISTANCE SWITCH
TONE CONTROL
VOLUME CONTROL
DOUBLE-SPOT TRIMMER & No. 3 R. F T.
FILTER COND.
1ST DET.
OSC.
I. F.
2ND DET.
AUDIO INPUT TRANS.
R. F.
2ND DET. I. F. TRANS.
2ND A.F.
1ST A. F.
G A
SPEAKER PLUG
No. 1 R. F T.
ANTENNA ADJUSTMENT

Top View.

The coil shield in the upper-right corner encloses the coupling unit between the 1st-detector and the I. F. tubes. The coil shield at bottom center encloses No. 2 R. F. T.


LOCAL-DISTANCE RESISTOR
MAROON
BY-PASS NO. 4
12
13
14
11
BY-PASS NO. 3
9
10
8
7
1st DETECTOR PLATE FILTER CHOKE
1st DET.
'32
OSCILLATOR PLATE CHOKE
OSCILLATOR GRID CONDENSER
OSC.
'30
No. 3 R. F. T.
2nd DETECTOR COUPLING RESISTOR
OSCILLATOR GRID LEAK
I.F. PLATE FILTER CHOKE
R.F. PLATE CHOKE
BLACK
YEL. & RED
BLACK
I.F.
'32
R. F.—1st DET. STOPPING CONDENSER
2nd DET. FILTER RESISTOR
BLEEDER RESISTOR No. 1
BLEEDER RESISTOR No. 3
R.F.
'32
2nd DET.—I.F. TRANSFORMER
BLACK
PURPLE & BLACK
BLUE & RED
1st DETECTOR GRID FILTER CHOKE
BLEEDER RESISTOR No. 2
NO. 2 R.F.T.
ANTENNA TRIMMER
No. 1 R. F T
1A
'30
242
5
6
4
BY-PASS NO. 2
AUDIO INPUT TRANSFORMER
3
2
1
BY-PASS NO. 1
QUALITY RESISTOR
SCREEN RESISTOR No. 2
SCREEN RESISTOR No. 1
MAROON
GRAY
RED & BLUE
GRAY
1st A. F. FILTER RESISTOR
ELECTROLYTIC CONDENSER
18
17
15
16
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
2nd DET.
'32
2nd DETECTOR PLATE CHOKE
"PHONE" CONDENSER
FILAMENT SERIES RESISTOR (YELLOW COVERED)
TERMINAL BLOCK
'33
2A
SPEAKER

Bottom Chart.

By-pass Condensers

By-pass No. 1

1—2nd-detector plate filter condenser.
2—Quality condenser.
3—Not used.

By-pass No. 2

4—2nd-detector—1st-A. F. coupling condenser.
5—2nd-detector grid-circuit by-pass.
6—Tracking condenser.

By-pass No. 3

7—1st-detector grid filter condenser.
8—R. F.—I. F. screen by-pass.
9—I. F. plate filter condenser.
10—R. F.—I. F. grid filter condenser.

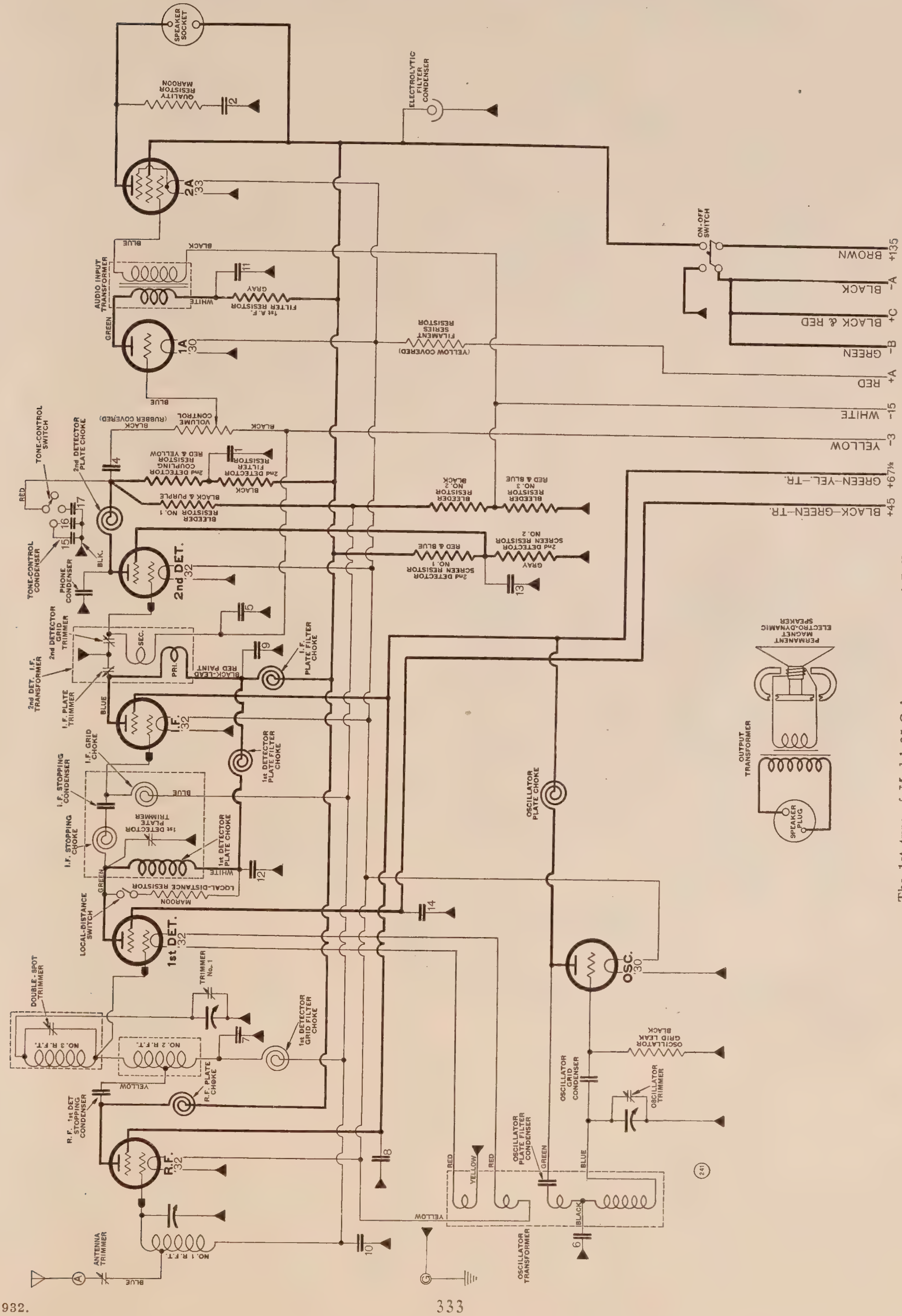
By-pass No. 4

11—1st-A. F. plate filter condenser.
12—1st-detector plate filter condenser.
13—2nd-detector screen by-pass.
14—1st-detector screen by-pass.

Tone-control Condenser

15—Tone-control condenser.
16—Tone-control condenser.
17—Tone-control condenser.
18—Not used.

MODEL 85-Q (2nd Type) Above Serial No. 163767

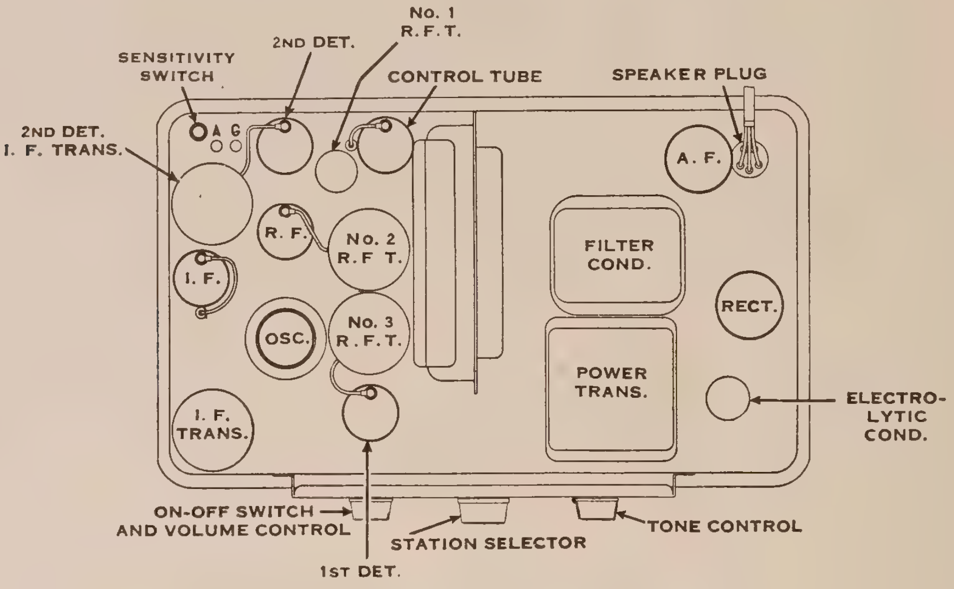

SPEAKER SOCKET
QUALITY RESISTOR MAROON
2
ELECTROLYTIC FILTER CONDENSER
2A '33
ON-OFF SWITCH
+135 BROWN
-A BLACK
+C BLACK & RED
-B GREEN
+A RED
-15 WHITE
-3 YELLOW
+67½ GREEN-YEL-TR.
+45 BLACK-GREEN-TR.
AUDIO INPUT TRANSFORMER
BLUE
BLACK
WHITE
GREEN
1st A.F. FILTER RESISTOR GRAY
11
1A '30
FILAMENT SERIES RESISTOR (YELLOW COVERED)
VOLUME CONTROL (RUBBER COVERED) BLACK
TONE-CONTROL SWITCH
RED
2nd DETECTOR PLATE CHOKE
4
2nd DETECTOR COUPLING RESISTOR RED & YELLOW
2nd DETECTOR FILTER RESISTOR BLACK
1
BLEEDER RESISTOR NO. 1 BLACK & PURPLE
BLEEDER RESISTOR NO. 2 BLACK
BLEEDER RESISTOR NO. 3 RED & BLUE
17
16
15
TONE-CONTROL CONDENSER
BLK.
PHONE CONDENSER
2nd DET. '32
2nd DETECTOR SCREEN RESISTOR NO. 1 RED & BLUE
2nd DETECTOR SCREEN RESISTOR NO. 2 GRAY
13
5
2nd DETECTOR GRID TRIMMER
SEC.
PRI.
2nd DET. I.F. TRANSFORMER
BLACK-LEAD RED PAINT
9
I.F. PLATE FILTER CHOKE
I.F. PLATE TRIMMER
I.F. '32
1st DETECTOR PLATE FILTER CHOKE
I.F. GRID CHOKE
I.F. STOPPING CONDENSER
I.F. STOPPING CHOKE
1st DETECTOR PLATE TRIMMER
1st DETECTOR PLATE CHOKE
12
LOCAL-DISTANCE RESISTOR MAROON
LOCAL-DISTANCE SWITCH
14
1st DET. '32
TRIMMER No. 1
DOUBLE-SPOT TRIMMER
NO. 3 R.F.T.
NO. 2 R.F.T.
7
1st DETECTOR GRID FILTER CHOKE
YELLOW
R.F. PLATE CHOKE
R.F. 1st DET STOPPING CONDENSER
R.F. '32
8
NO. 1 R.F.T.
10
ANTENNA TRIMMER
A
OSCILLATOR PLATE CHOKE
OSC. '30
OSCILLATOR GRID LEAK BLACK
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
OSCILLATOR PLATE FILTER CONDENSER
OSCILLATOR TRANSFORMER
6
241
PERMANENT MAGNET ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG

The 1st type of Model 85-Q has two stages of I. F. and no R. F. stage.

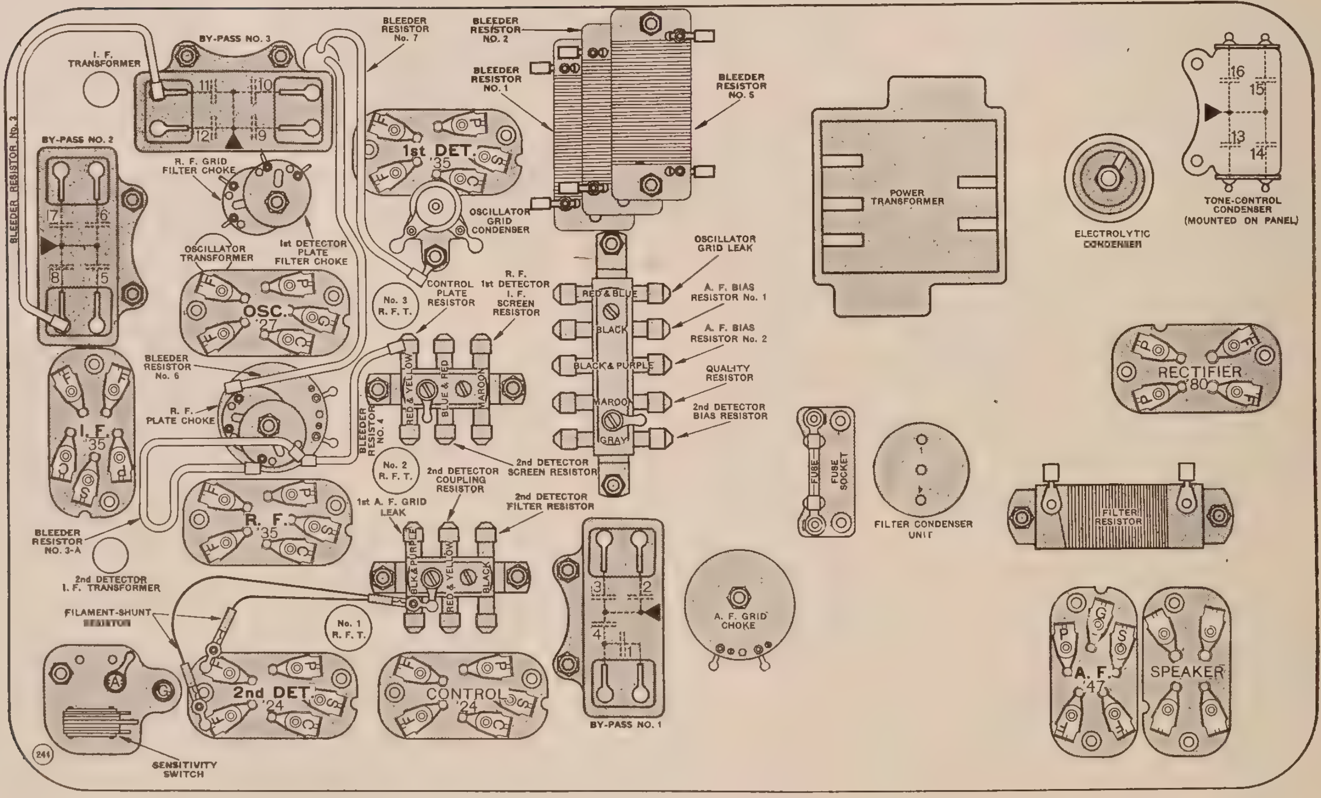
MODEL 86 (2nd Type) Above Serial No. 5876861
MODEL 86-F (2nd Type) Above Serial No. 7168925

TUBES

R. F.	=	'35
1st Det.	=	'35
I. F.	=	'35
2nd Det.	=	'24
A. F.	=	'47
Osc.	=	'27
Control	=	'24
Rectifier	=	'80


No. 1
R. F. T.
2ND DET.
SENSITIVITY
SWITCH
CONTROL TUBE
SPEAKER PLUG
2ND DET.
I. F. TRANS.
A G
A. F.
R. F.
No. 2
R. F T.
I. F.
FILTER
COND.
RECT.
OSC.
No. 3
R. F. T.
POWER
TRANS.
I. F.
TRANS.
ELECTRO-
LYTIC
COND.
ON-OFF SWITCH
AND VOLUME CONTROL
STATION SELECTOR
TONE CONTROL
1ST DET.

Top View.


BY-PASS NO. 3
I. F.
TRANSFORMER
11
10
12
9
BLEEDER RESISTOR No. 7
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
BLEEDER RESISTOR NO. 5
BLEEDER RESISTOR No. 3
BY-PASS NO. 2
7
6
8
5
R. F. GRID FILTER CHOKE
1st DET.
'35
OSCILLATOR GRID CONDENSER
OSCILLATOR TRANSFORMER
1st DETECTOR PLATE FILTER CHOKE
OSC.
'27
No. 3
R. F. T.
CONTROL PLATE RESISTOR
R. F. 1st DETECTOR I. F. SCREEN RESISTOR
OSCILLATOR GRID LEAK
RED & BLUE
A. F. BIAS RESISTOR No. 1
BLACK
A. F. BIAS RESISTOR No. 2
BLACK & PURPLE
QUALITY RESISTOR
MAROON
2nd DETECTOR BIAS RESISTOR
GRAY
BLEEDER RESISTOR No. 6
R. F. PLATE CHOKE
RED & YELLOW
BLUE & RED
MAROON
BLEEDER RESISTOR NO. 4
I. F.
'35
No. 2
R. F. T.
2nd DETECTOR SCREEN RESISTOR
2nd DETECTOR COUPLING RESISTOR
1st A. F. GRID LEAK
2nd DETECTOR FILTER RESISTOR
R. F.
'35
BLEEDER RESISTOR NO. 3-A
2nd DETECTOR I. F. TRANSFORMER
BLK & PURPLE
RED & YELLOW
BLACK
FILAMENT-SHUNT RESISTOR
No. 1
R. F. T.
A
G
2nd DET.
'24
CONTROL
'24
3
2
4
1
BY-PASS NO. 1
A. F. GRID CHOKE
244
SENSITIVITY SWITCH
POWER TRANSFORMER
ELECTROLYTIC CONDENSER
16
15
13
14
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
RECTIFIER
'80
FUSE
FUSE SOCKET
FILTER CONDENSER UNIT
FILTER RESISTOR
A. F.
'47
SPEAKER
F
P
G
S
C

Bottom Chart.
The filter resistor is not used in 86-F.

By-pass Condensers

By-pass No. 1

1—2nd-detector—A. F. coupling condenser.
2—Quality condenser.
3—2nd-detector bias by-pass.
4—Phone condenser.

By-pass No. 2

5—A. F. bias by-pass.
6—R. F. grid filter condenser.
7—Control plate by-pass.
8—R. F.—I. F. bias by-pass.

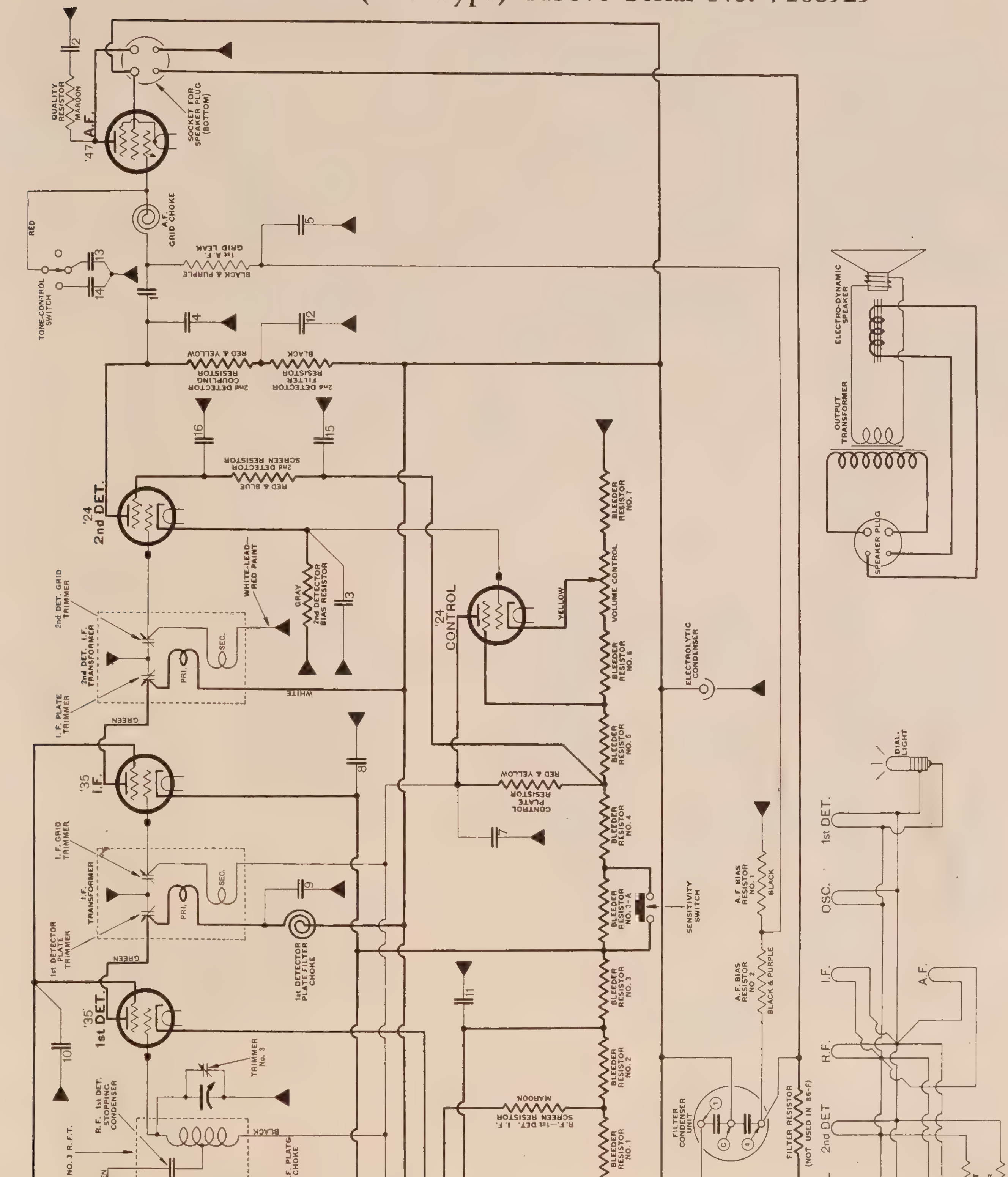
By-pass No. 3

9—1st-detector plate filter condenser.
10—Screen by-pass.
11—1st-detector bias by-pass.
12—2nd-detector plate filter condenser.

Tone-control Condenser

13—Tone-control condenser.
14—Tone-control condenser.
15—2nd-detector screen by-pass.
16—2nd-detector screen by-pass.

MODEL 86 (2nd Type) Above Serial No. 5876861
MODEL 86-F (2nd Type) Above Serial No. 7168925

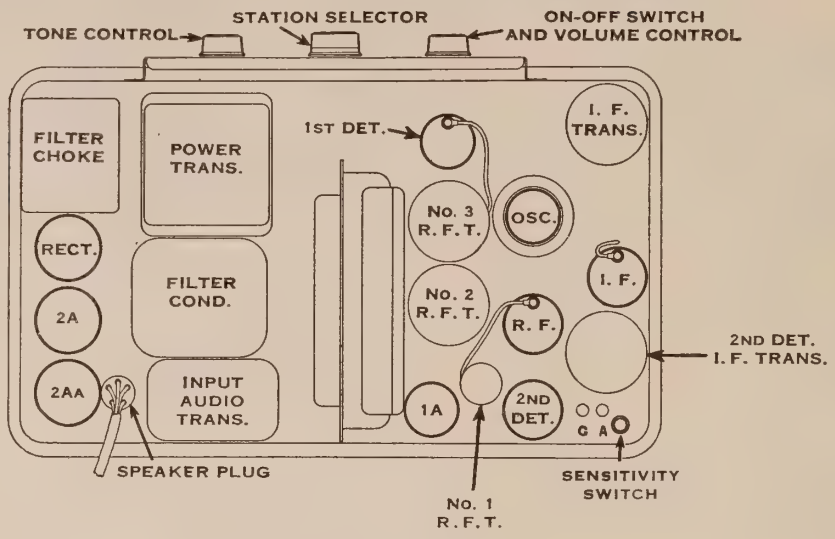

QUALITY RESISTOR MAROON
'47 A.F.
2
SOCKET FOR SPEAKER PLUG (BOTTOM)
A.F. GRID CHOKE
RED
1st A.F. GRID LEAK BLACK & PURPLE
5
TONE-CONTROL SWITCH
13
14
1
4
12
2nd DETECTOR COUPLING RESISTOR RED & YELLOW
2nd DETECTOR FILTER RESISTOR BLACK
16
15
2nd DETECTOR SCREEN RESISTOR RED & BLUE
'24 2nd DET.
WHITE-LEAD-RED PAINT
GRAY 2nd DETECTOR BIAS RESISTOR
3
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
SEC.
PRI.
I.F. PLATE TRIMMER
WHITE
GREEN
'24 CONTROL
YELLOW
BLEEDER RESISTOR NO. 7
VOLUME CONTROL
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 5
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 3-A
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
ELECTROLYTIC CONDENSER
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
'35 I.F.
8
CONTROL PLATE RESISTOR RED & YELLOW
7
I.F. GRID TRIMMER
I.F. TRANSFORMER
SEC.
PRI.
9
1st DETECTOR PLATE FILTER CHOKE
SENSITIVITY SWITCH
A.F. BIAS RESISTOR NO. 1 BLACK
A.F. BIAS RESISTOR NO. 2 BLACK & PURPLE
DIAL LIGHT
1st DET.
OSC.
I.F.
A.F.
R.F.
2nd DET
CONTROL
1st DETECTOR PLATE TRIMMER
GREEN
'35 1st DET.
11
10
TRIMMER No. 3
R.F. 1st DET. STOPPING CONDENSER
NO. 3 R.F.T.
BLACK
GREEN
R.F. PLATE CHOKE
R.F.—1st DET. I.F. SCREEN RESISTOR MAROON
FILTER CONDENSER UNIT
FILTER RESISTOR (NOT USED IN 86-F)
FILAMENT SHUNT RESISTOR
'35 R.F.
'27 OSC.
'80 RECTIFIER
OSCILLATOR GRID LEAK RED & BLUE
HIGH VOLTAGE SECONDARY
TRIMMER No. 2
R.F. GRID FILTER CHOKE
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
NO. 2 R.F.T.
BLACK
TRIMMER No. 1
6
NO. 1 R.F.T.
GREEN
BLACK
BLUE
A
G
YELLOW
RED
GREEN
BLUE
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
BLACK
PRIMARY
ON-OFF SWITCH
POWER TRANSFORMER
110-VOLT CABLE
FUSE
243

In Model 86-F, the filter resistor is not used, and the control plate resistor is red and gray.

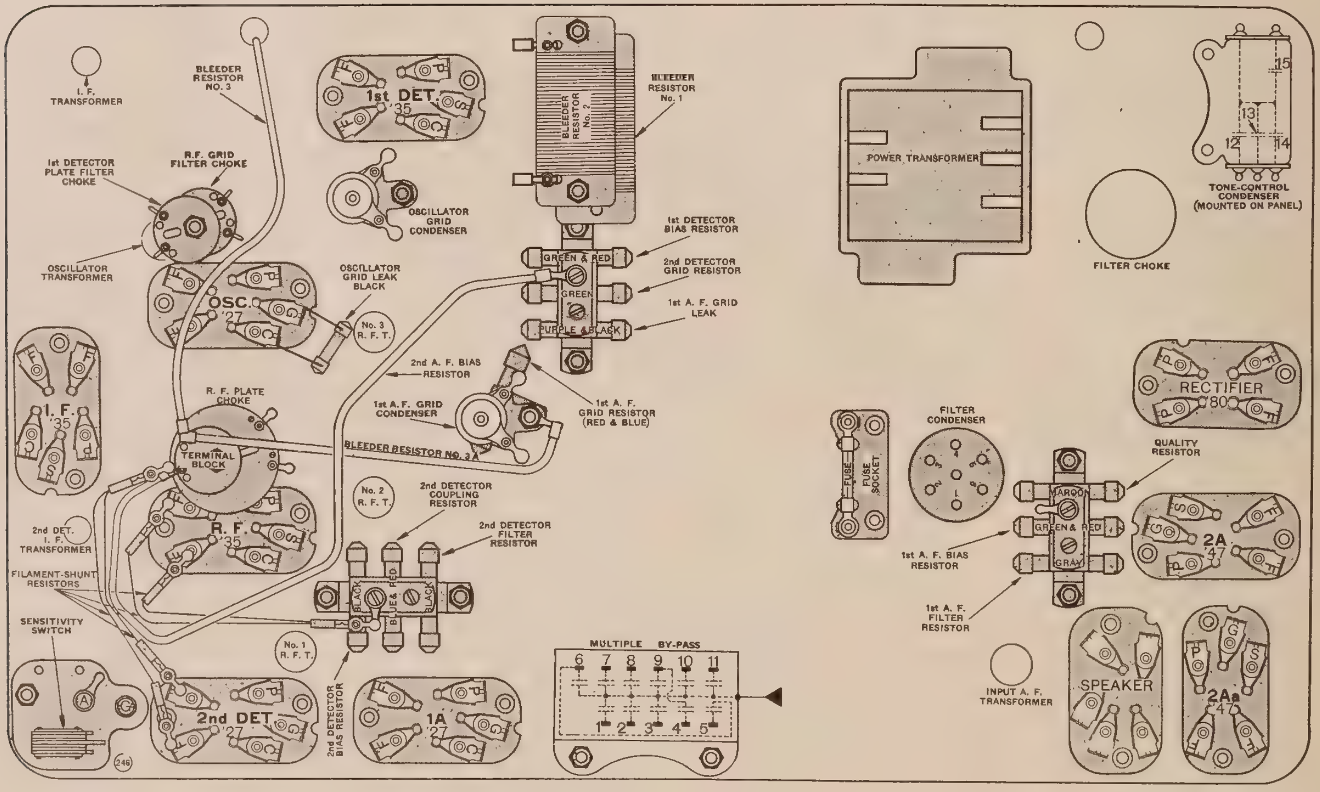
MODEL 87 (3rd Type) Above Serial No. 2525871

TUBES

R. F. = '35
1st Det. = '35
I. F. = '35
2nd Det. = '27
1st A. F. = '27
2nd A. F. = '47(2)
Osc. = '27
Rectifier = '80


TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH AND VOLUME CONTROL
FILTER CHOKE
POWER TRANS.
1ST DET.
I. F. TRANS.
No. 3 R. F. T.
OSC.
I. F.
RECT.
FILTER COND.
No. 2 R. F. T.
R. F.
2ND DET. I. F. TRANS.
2A
2AA
INPUT AUDIO TRANS.
1A
2ND DET.
G A
SPEAKER PLUG
SENSITIVITY SWITCH
No. 1 R. F. T.

Top View.

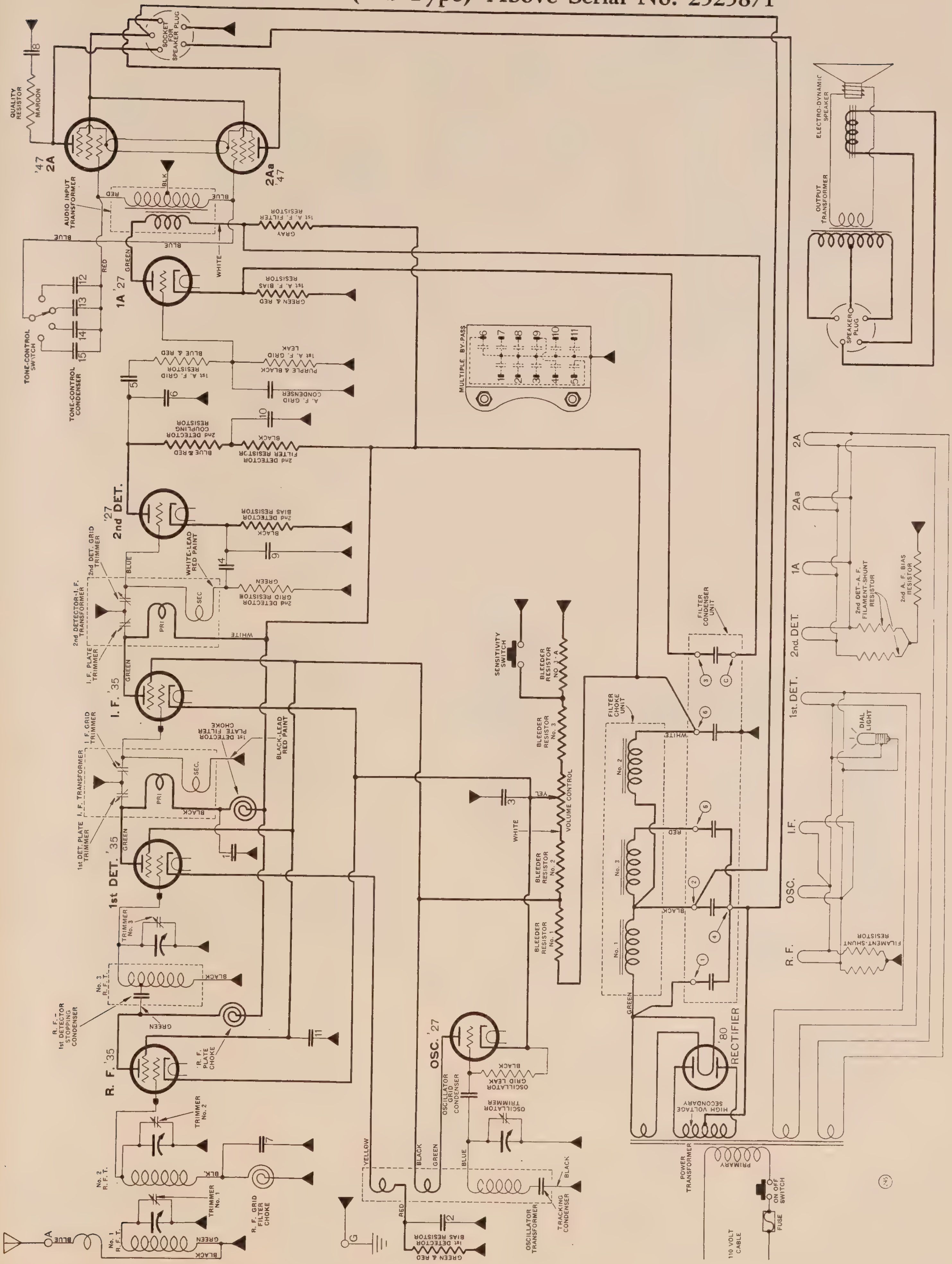

I. F. TRANSFORMER
BLEEDER RESISTOR NO. 3
1st DET. '35
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
1st DETECTOR PLATE FILTER CHOKE
R.F. GRID FILTER CHOKE
OSCILLATOR GRID CONDENSER
OSCILLATOR TRANSFORMER
OSC. '27
OSCILLATOR GRID LEAK BLACK
No. 3 R. F. T.
1st DETECTOR BIAS RESISTOR
2nd DETECTOR GRID RESISTOR
1st A. F. GRID LEAK
GREEN & RED
GREEN
PURPLE & BLACK
I. F. '35
2nd A. F. BIAS RESISTOR
1st A. F. GRID CONDENSER
1st A. F. GRID RESISTOR (RED & BLUE)
R. F. PLATE CHOKE
TERMINAL BLOCK
BLEEDER RESISTOR NO. 3 A
No. 2 R. F. T.
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
2nd DET. I. F. TRANSFORMER
R. F. '35
FILAMENT-SHUNT RESISTORS
BLACK
BLUE & RED
BLACK
SENSITIVITY SWITCH
No. 1 R. F. T.
2nd DETECTOR BIAS RESISTOR
2nd DET. '27
1A '27
246
MULTIPLE BY-PASS
6 7 8 9 10 11
1 2 3 4 5
POWER TRANSFORMER
FILTER CHOKE
12 13 14 15
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
RECTIFIER '80
FUSE
FUSE SOCKET
FILTER CONDENSER
QUALITY RESISTOR
MAROON
GREEN & RED
GRAY
1st A. F. BIAS RESISTOR
1st A. F. FILTER RESISTOR
2A '47
INPUT A. F. TRANSFORMER
SPEAKER
2Aa '47
P G S F C

Bottom Chart.

By-pass Condensers

1—1st-detector plate filter condenser.
2—1st-detector bias by-pass.
3—R. F.—I. F. bias by-pass.
4—2nd-detector grid-circuit by-pass.
5—2nd-detector—1st-A. F. coupling condenser.
6—Phone condenser.
7—R. F. grid filter condenser.
8—Quality condenser.
9—2nd-detector bias by-pass.
10—2nd-detector plate filter condenser.
11—Screen by-pass.

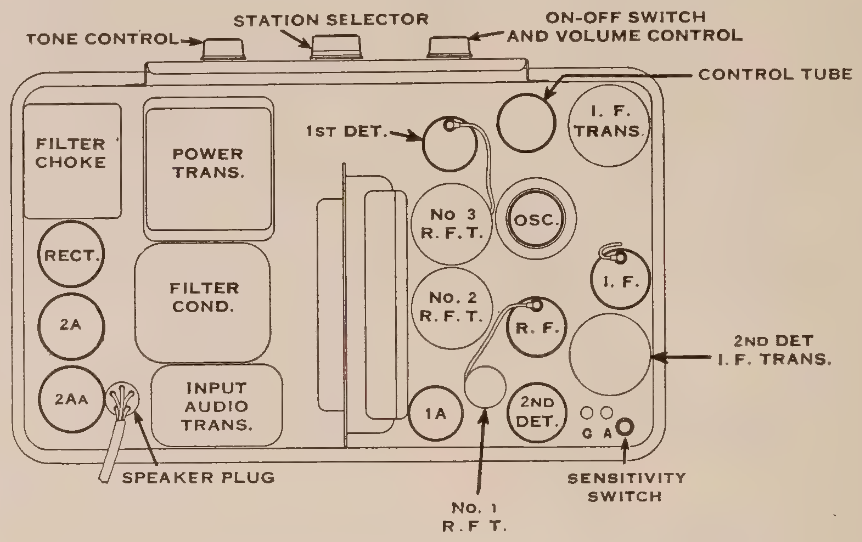
MODEL 87 (3rd Type) Above Serial No. 2525871


SOCKET FOR SPEAKER PLUG
QUALITY RESISTOR MAROON
'47 2A
2Aa '47
AUDIO INPUT TRANSFORMER
RED
BLK
BLUE
1st A. F. FILTER RESISTOR GRAY
GREEN
WHITE
1A '27
1st A. F. BIAS RESISTOR GREEN & RED
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
1st A. F. GRID RESISTOR BLUE & RED
1st A. F. GRID LEAK PURPLE & BLACK
A. F. GRID CONDENSER
2nd DETECTOR COUPLING RESISTOR BLUE & RED
2nd DETECTOR FILTER RESISTOR BLACK
'27 2nd DET.
2nd DETECTOR BIAS RESISTOR BLACK
2nd DETECTOR GRID RESISTOR GREEN
WHITE-LEAD RED PAINT
2nd DET. GRID TRIMMER
2nd DETECTOR-I. F. TRANSFORMER
SEC
PRI
I. F. PLATE TRIMMER
I. F. '35
I. F. GRID TRIMMER
1st DETECTOR PLATE FILTER CHOKE
BLACK-LEAD RED PAINT
I. F. TRANSFORMER
1st DET. PLATE TRIMMER
1st DET. '35
TRIMMER No. 3
No. 3 R. F. T.
R. F. - 1st DETECTOR STOPPING CONDENSER
R. F. '35
R. F. PLATE CHOKE
TRIMMER No. 2
No. 2 R. F. T.
TRIMMER No. 1
No. 1 R. F. T.
R. F. GRID FILTER CHOKE
A
G
MULTIPLE BY-PASS
SENSITIVITY SWITCH
BLEEDER RESISTOR No. 3-A
BLEEDER RESISTOR No. 3
VOLUME CONTROL
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
YEL
OSC. '27
OSCILLATOR GRID LEAK BLACK
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
YELLOW
BLUE
1st DETECTOR BIAS RESISTOR GREEN & RED
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
POWER TRANSFORMER
PRIMARY
ON OFF SWITCH
FUSE
110 VOLT CABLE
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
2A
2Aa
1A
2nd DET.
1st DET.
I. F.
OSC.
R. F.
2nd DET.-A. F. FILAMENT-SHUNT RESISTOR
2nd A. F. BIAS RESISTOR
DIAL LIGHT
FILAMENT-SHUNT RESISTOR

MODEL 89 (3rd Type) Above Serial No. 6755181
MODEL 89-F (3rd Type) Above Serial No. 1585395
MODEL 89-P (3rd Type) Above Serial No. 1935904

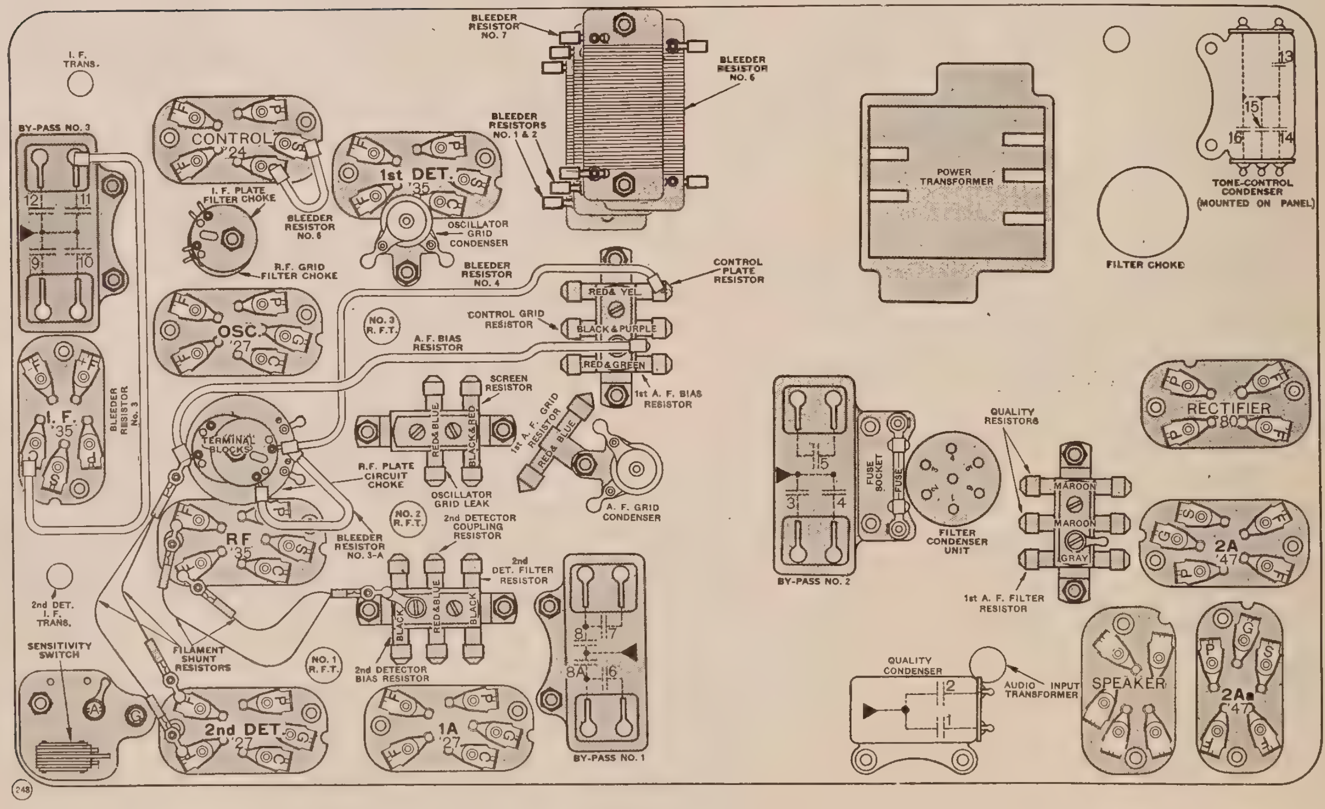
TUBES

R. F. = '35
1st Det. = '35
I. F. = '35
2nd Det. = '27
1st A. F. = '27
2nd A. F. = '47 (2)
Osc. = '27
Control = '24
Rectifier = '80


TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH AND VOLUME CONTROL
CONTROL TUBE
FILTER CHOKE
POWER TRANS.
1ST DET.
I. F. TRANS.
No 3 R. F. T.
OSC.
RECT.
FILTER COND.
I. F.
No. 2 R. F. T.
R. F.
2A
2ND DET I. F. TRANS.
2AA
INPUT AUDIO TRANS.
1A
2ND DET.
G A
SPEAKER PLUG
SENSITIVITY SWITCH
No. 1 R. F. T.

Top View.

Model 89-P has two binding posts for pick-up connection at the rear of the chassis, and a radio-phono toggle switch is mounted on the front panel.


I. F. TRANS.
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
BLEEDER RESISTORS NO. 1 & 2
BY-PASS NO. 3
12
11
9
10
CONTROL '24
F P S G F
1st DET. '35
I. F. PLATE FILTER CHOKE
BLEEDER RESISTOR NO. 6
OSCILLATOR GRID CONDENSER
R.F. GRID FILTER CHOKE
BLEEDER RESISTOR NO. 4
CONTROL PLATE RESISTOR
RED & YEL.
CONTROL GRID RESISTOR
BLACK & PURPLE
RED & GREEN
1st A. F. BIAS RESISTOR
OSC. '27
NO. 3 R. F. T.
A. F. BIAS RESISTOR
I. F. '35
BLEEDER RESISTOR No. 3
SCREEN RESISTOR
RED & BLUE
BLACK & RED
1st A. F. GRID RESISTOR
RED & BLUE
TERMINAL BLOCKS
R.F. PLATE CIRCUIT CHOKE
OSCILLATOR GRID LEAK
A. F. GRID CONDENSER
RF '35
BLEEDER RESISTOR NO. 3-A
NO. 2 R. F. T.
2nd DETECTOR COUPLING RESISTOR
2nd DET. FILTER RESISTOR
BLACK
RED & BLUE
BLACK
2nd DET. I. F. TRANS.
SENSITIVITY SWITCH
FILAMENT SHUNT RESISTORS
NO. 1 R. F. T.
2nd DETECTOR BIAS RESISTOR
A
G
2nd DET. '27
1A '27
8
7
8A
16
BY-PASS NO. 1
248
POWER TRANSFORMER
FILTER CHOKE
13
15
16
14
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
RECTIFIER '80
5
3
4
FUSE SOCKET
FUSE
FILTER CONDENSER UNIT
BY-PASS NO. 2
QUALITY RESISTORS
MAROON
MAROON
GRAY
1st A. F. FILTER RESISTOR
2A '47
QUALITY CONDENSER
2
1
AUDIO INPUT TRANSFORMER
SPEAKER
2A '47

Bottom Chart.

By-pass Condensers

By-pass No. 1

6—2nd-detector—1st-A. F. coupling condenser.
7—Not used.
8—2nd-detector bias by-pass.
8A—Phone condenser.

By-pass No. 2

3—R. F.—I. F. bias by-pass.
4—2nd-detector plate filter condenser.
5—Screen by-pass.

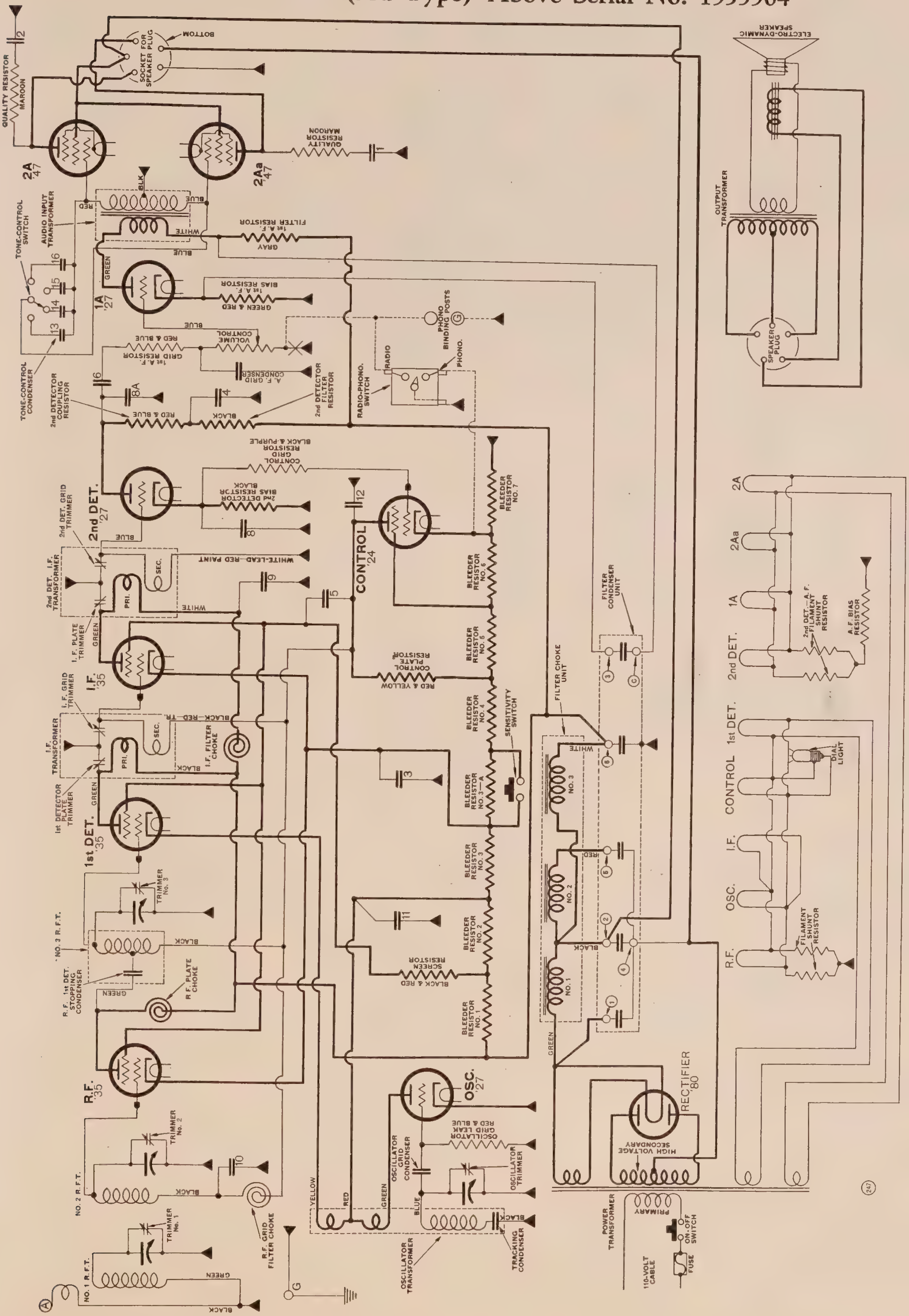
By-pass No. 3

9—I. F. plate filter condenser.
10—R. F. grid filter condenser.
11—1st-detector bias by-pass.
12—Control plate by-pass.

Tone-control Condenser

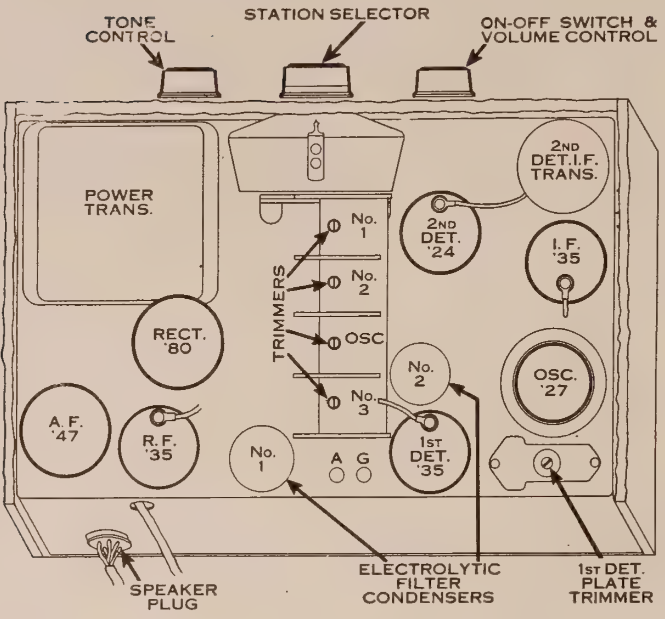
13—Tone-control condenser.
14—Tone-control condenser.
15—Tone-control condenser.
16—Tone-control condenser.

MODEL 89 (3rd Type) Above Serial No. 6755181
MODEL 89-F (3rd Type) Above Serial No. 1585395
MODEL 89-P (3rd Type) Above Serial No. 1935904

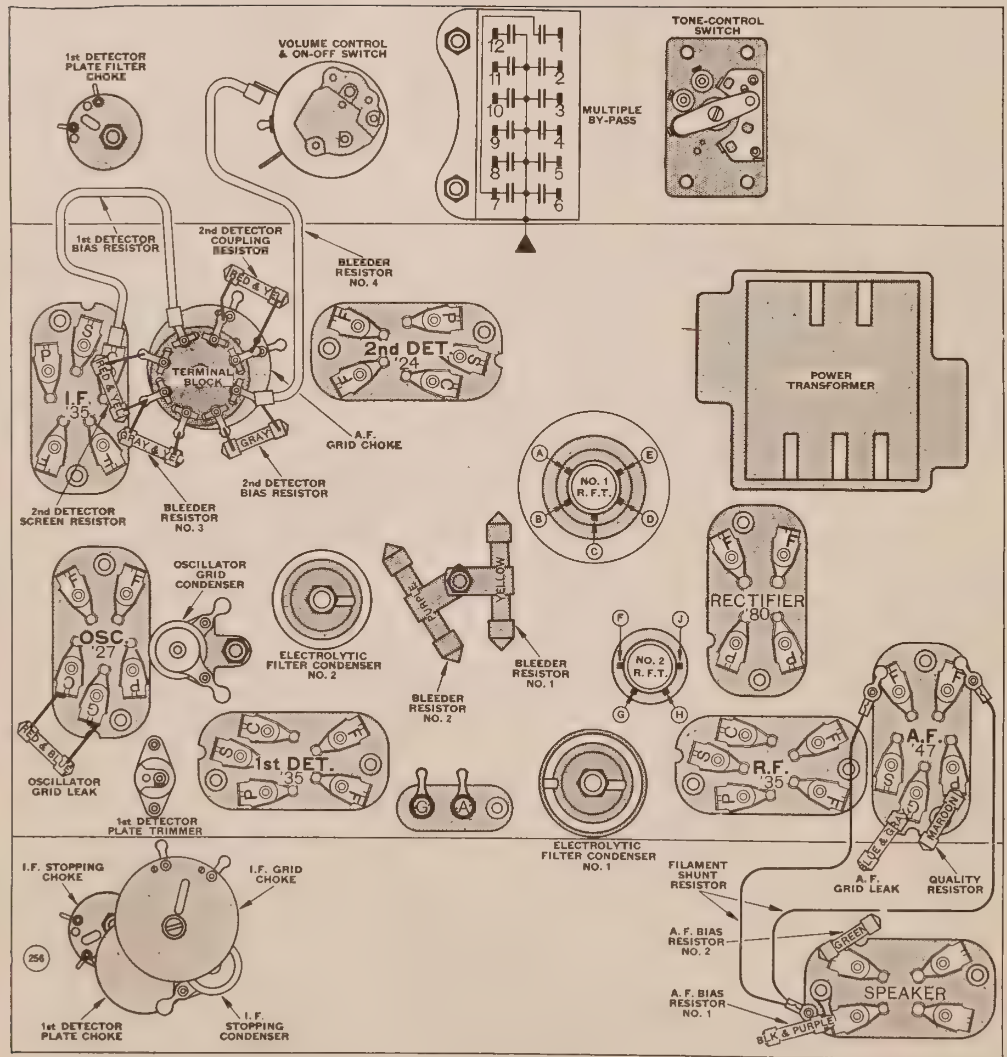

QUALITY RESISTOR MAROON
SOCKET FOR SPEAKER PLUG
BOTTOM
2A '47
2Aa '47
QUALITY RESISTOR MAROON
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
AUDIO INPUT TRANSFORMER
BLK
RED
BLUE
WHITE
1st A.F. FILTER RESISTOR GRAY
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
1A '27
GREEN
1st A.F. BIAS RESISTOR GREEN & RED
VOLUME CONTROL
1st A.F. GRID RESISTOR RED & BLUE
A. F. GRID CONDENSER
PHONO BINDING POSTS
RADIO
PHONO.
RADIO-PHONO. SWITCH
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
RED & BLUE
BLACK
CONTROL GRID RESISTOR BLACK & PURPLE
2nd DETECTOR BIAS RESISTOR BLACK
2nd DET. '27
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
SEC.
PRI.
WHITE-LEAD-RED PAINT
CONTROL '24
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 5
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 3-A
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
CONTROL PLATE RESISTOR RED & YELLOW
SENSITIVITY SWITCH
I.F. PLATE TRIMMER
I.F. '35
I.F. GRID TRIMMER
I.F. TRANSFORMER
BLACK-RED-TR.
I.F. FILTER CHOKE
1st DETECTOR PLATE TRIMMER
1st DET. '35
TRIMMER No. 3
NO. 2 R.F.T.
R.F. 1st DET. STOPPING CONDENSER
R.F. PLATE CHOKE
SCREEN RESISTOR BLACK & RED
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
NO. 3
NO. 2
NO. 1
R.F. '35
TRIMMER No. 2
NO. 2 R.F.T.
R.F. GRID FILTER CHOKE
TRIMMER No. 1
NO. 1 R.F.T.
GREEN
BLACK
A
G
OSC. '27
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
YELLOW
RED
BLUE
RECTIFIER '80
HIGH VOLTAGE SECONDARY
POWER TRANSFORMER
PRIMARY
ON-OFF SWITCH
110-VOLT CABLE
FUSE
2A
2Aa
1A
2nd DET.
1st DET.
CONTROL
I.F.
OSC.
R.F.
2nd DET.-A.F. FILAMENT SHUNT RESISTOR
A.F. BIAS RESISTOR
DIAL LIGHT
FILAMENT SHUNT RESISTOR
(247)

The phonograph equipment, circuit, and parts in Model 89-P are the same as described on pages 236 to 240 of the Service Manual. The phonograph-switching circuit in 89-P is shown above in dotted lines.

MODEL 90, 90-F


TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH & VOLUME CONTROL
POWER TRANS.
2ND DET. I.F. TRANS.
No. 1
No. 2
OSC
No. 3
TRIMMERS
2ND DET. '24
I.F. '35
RECT. '80
No. 2
OSC. '27
A.F. '47
R.F. '35
No. 1
A
G
1ST DET. '35
SPEAKER PLUG
ELECTROLYTIC FILTER CONDENSERS
1ST DET. PLATE TRIMMER

Top View.


1st DETECTOR PLATE FILTER CHOKE
VOLUME CONTROL & ON-OFF SWITCH
12
11
10
9
8
7
1
2
3
4
5
6
MULTIPLE BY-PASS
TONE-CONTROL SWITCH
1st DETECTOR BIAS RESISTOR
2nd DETECTOR COUPLING RESISTOR
BLEEDER RESISTOR NO. 4
RED & YEL
TERMINAL BLOCK
I.F. '35
2nd DET. '24
GRAY & YEL
GRAY
A.F. GRID CHOKE
2nd DETECTOR BIAS RESISTOR
2nd DETECTOR SCREEN RESISTOR
BLEEDER RESISTOR NO. 3
POWER TRANSFORMER
NO. 1 R.F.T.
OSCILLATOR GRID CONDENSER
OSC. '27
ELECTROLYTIC FILTER CONDENSER NO. 2
PURPLE
YELLOW
BLEEDER RESISTOR NO. 1
BLEEDER RESISTOR NO. 2
NO. 2 R.F.T.
RECTIFIER '80
RED & BLUE
OSCILLATOR GRID LEAK
1st DETECTOR PLATE TRIMMER
1st DET. '35
G
A
ELECTROLYTIC FILTER CONDENSER NO. 1
R.F. '35
A.F. '47
BLUE & GRAY
MAROON
A.F. GRID LEAK
QUALITY RESISTOR
I.F. STOPPING CHOKE
I.F. GRID CHOKE
256
1st DETECTOR PLATE CHOKE
I.F. STOPPING CONDENSER
FILAMENT SHUNT RESISTOR
A. F. BIAS RESISTOR NO. 2
A. F. BIAS RESISTOR NO. 1
GREEN
BLK & PURPLE
SPEAKER

Bottom Chart.

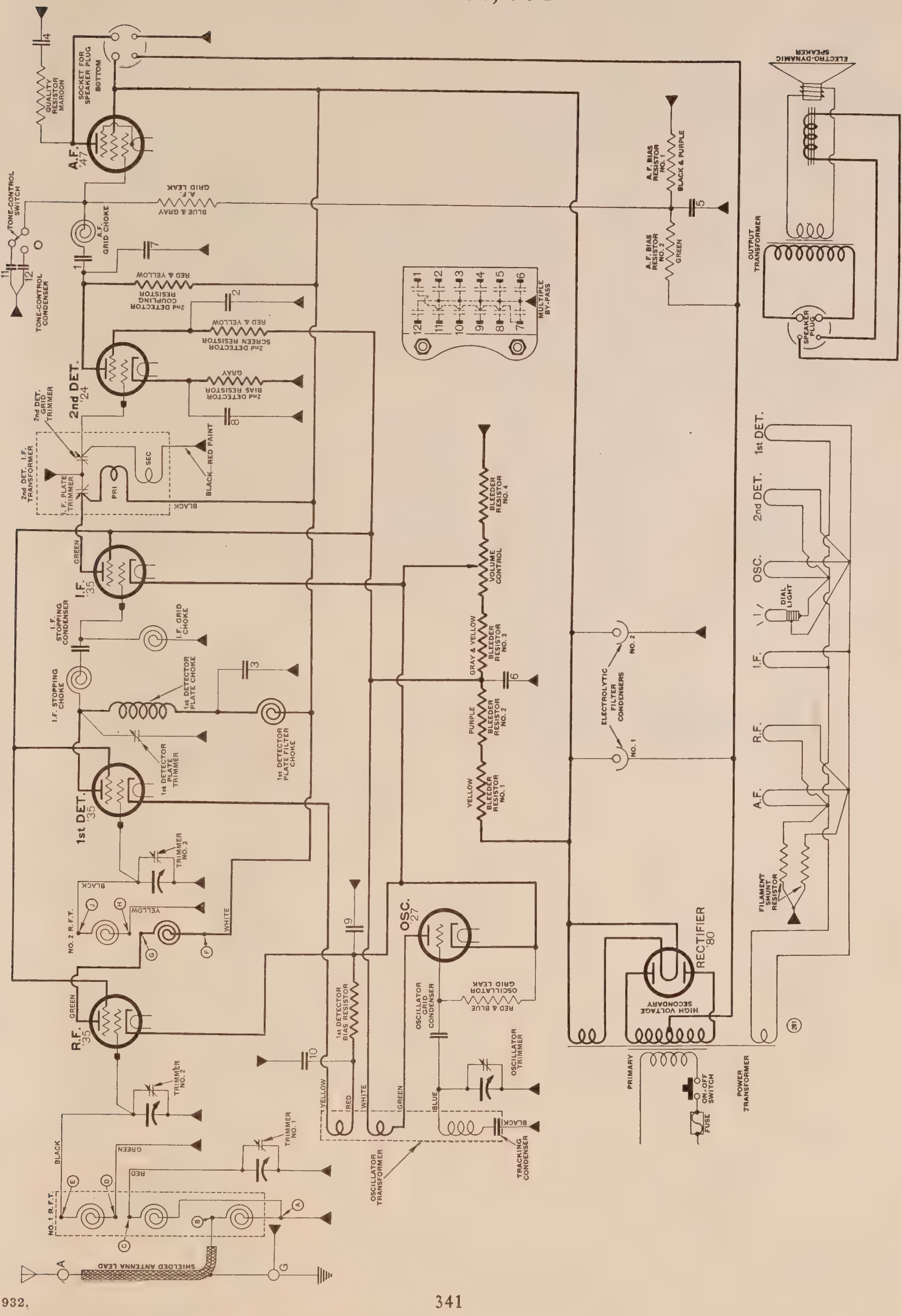
In some sets, the colors of bleeders No. 1 and No. 2 may be reversed. This does not affect the operation.

In late-type sets, the connections to R. F. T. No. 2 are as follows:—Yellow to F, black to G, white to H, green to J.

By-pass Condensers

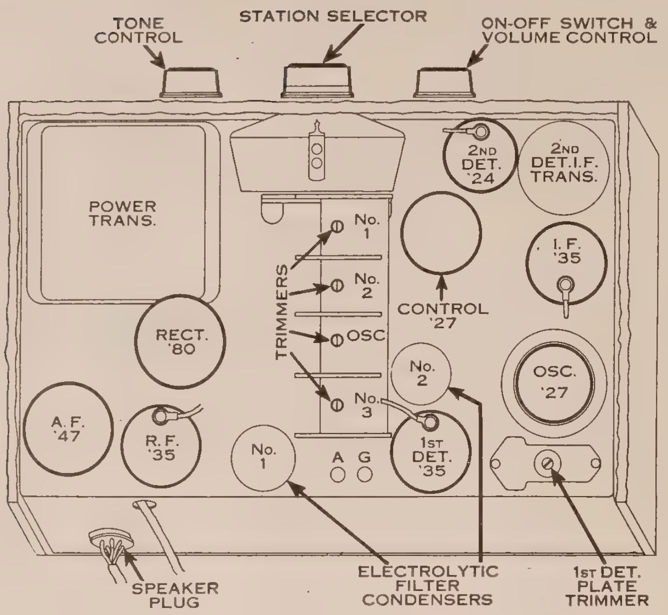
1—2nd-detector—A. F. coupling condenser.
2—2nd-detector screen by-pass.
3—1st-detector plate filter condenser.
4—Quality condenser.
5—A. F. bias by-pass.
6—R. F.—1st-detector—I. F. screen by-pass.
7—Phone condenser.
8—2nd-detector bias by-pass.
9—R. F. bias by-pass.
10—1st-detector bias by-pass.
11—Tone-condenser.
12—Tone condenser.

MODEL 90, 90-F


QUALITY RESISTOR MAROON
SOCKET FOR SPEAKER PLUG BOTTOM
A.F. '47
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
A.F. GRID LEAK BLUE & GRAY
A.F. GRID CHOKE
2nd DETECTOR COUPLING RESISTOR RED & YELLOW
2nd DETECTOR SCREEN RESISTOR RED & YELLOW
2nd DETECTOR BIAS RESISTOR GRAY
2nd DET. '24
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
I.F. PLATE TRIMMER
PRI
SEC
BLACK—RED PAINT
BLACK
GREEN
I.F. '35
I.F. STOPPING CONDENSER
I.F. GRID CHOKE
I.F. STOPPING CHOKE
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
1st DETECTOR PLATE FILTER CHOKE
1st DET. '35
TRIMMER NO. 3
NO. 2 R.F.T.
YELLOW
WHITE
R.F. '35
TRIMMER NO. 2
TRIMMER NO. 1
NO. 1 R.F.T.
RED
SHIELDED ANTENNA LEAD
A
G
1st DETECTOR BIAS RESISTOR
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR TRIMMER
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
BLUE
MULTIPLE BY-PASS
BLEEDER RESISTOR NO. 4
VOLUME CONTROL
GRAY & YELLOW BLEEDER RESISTOR NO. 3
PURPLE BLEEDER RESISTOR NO. 2
YELLOW BLEEDER RESISTOR NO. 1
ELECTROLYTIC FILTER CONDENSERS
NO. 1
NO. 2
A.F. BIAS RESISTOR NO. 1 BLACK & PURPLE
A.F. BIAS RESISTOR NO. 2 GREEN
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
ON-OFF SWITCH
FUSE
POWER TRANSFORMER
FILAMENT SHUNT RESISTOR
1st DET.
2nd DET.
OSC.
DIAL LIGHT
I.F.
R.F.
A.F.

The colors of bleeders No. 1 and No. 2 may be reversed in some sets. This does not affect the operation.

MODEL 92, 92-F TOP VIEW
MODEL 92 (Late Type) BOTTOM CHART


TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH & VOLUME CONTROL
POWER TRANS.
2ND DET. '24
2ND DET. I.F. TRANS.
No. 1
No. 2
OSC
No. 3
TRIMMERS
CONTROL '27
I.F. '35
RECT. '80
OSC. '27
No. 2
A.F. '47
R.F. '35
No. 1
A G
1ST DET. '35
SPEAKER PLUG
ELECTROLYTIC FILTER CONDENSERS
1ST DET. PLATE TRIMMER

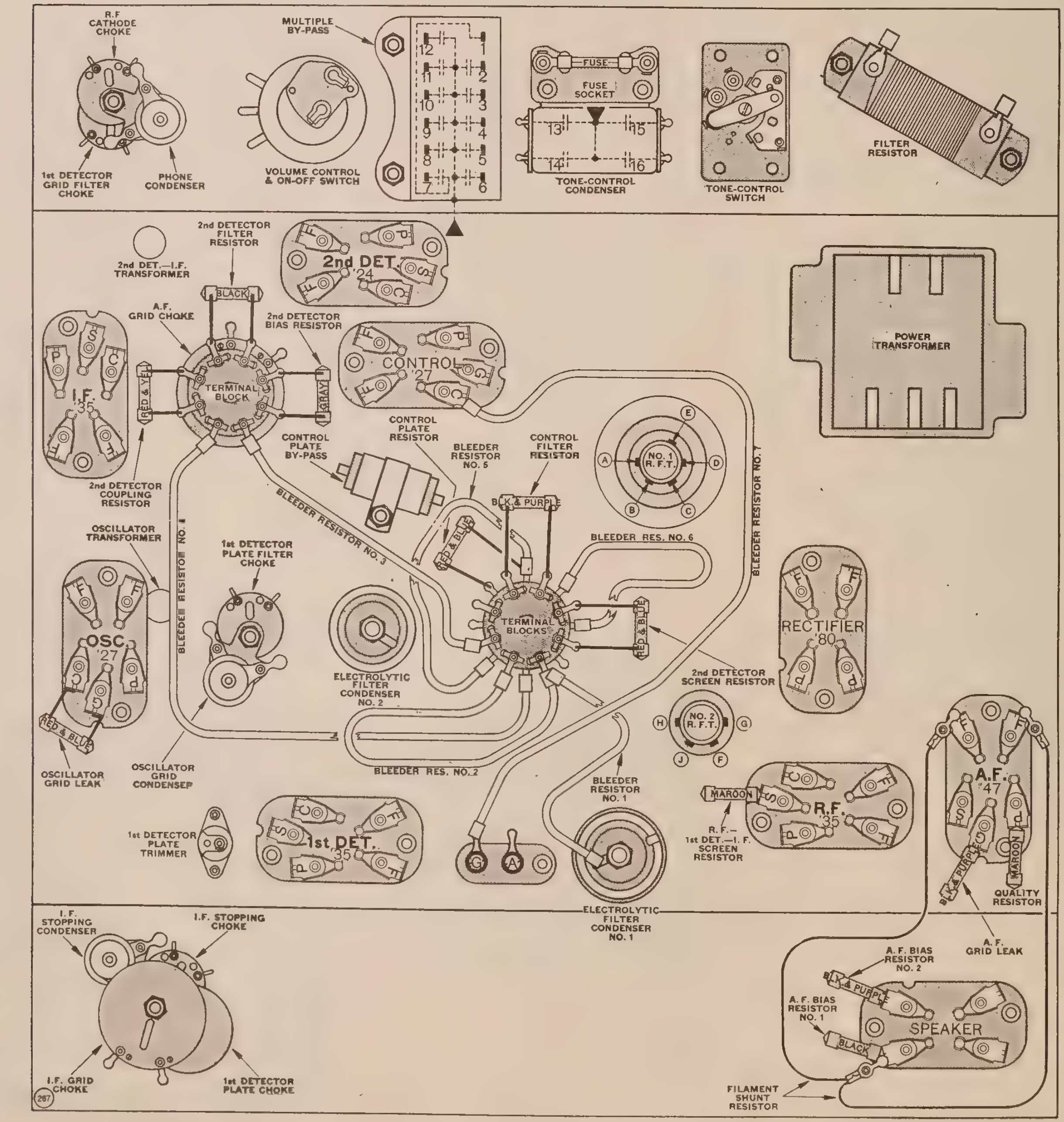
Top View.

By-pass Condensers in Late-Type 92 and 92-F

1—2nd-detector—A. F. coupling condenser.
2—A. F. bias by-pass.
3—1st-detector grid filter condenser.
4—2nd-detector bias by-pass.
5—R. F. grid filter condenser.
6—1st-detector bias by-pass.
7—2nd-detector—A. F. coupling condenser.
8—R. F. bias by-pass.
9—R. F. 1st-detector—I. F. screen by-pass.
10—I. F. bias by-pass.
11—1st-detector plate filter condenser.
12—Quality condenser.

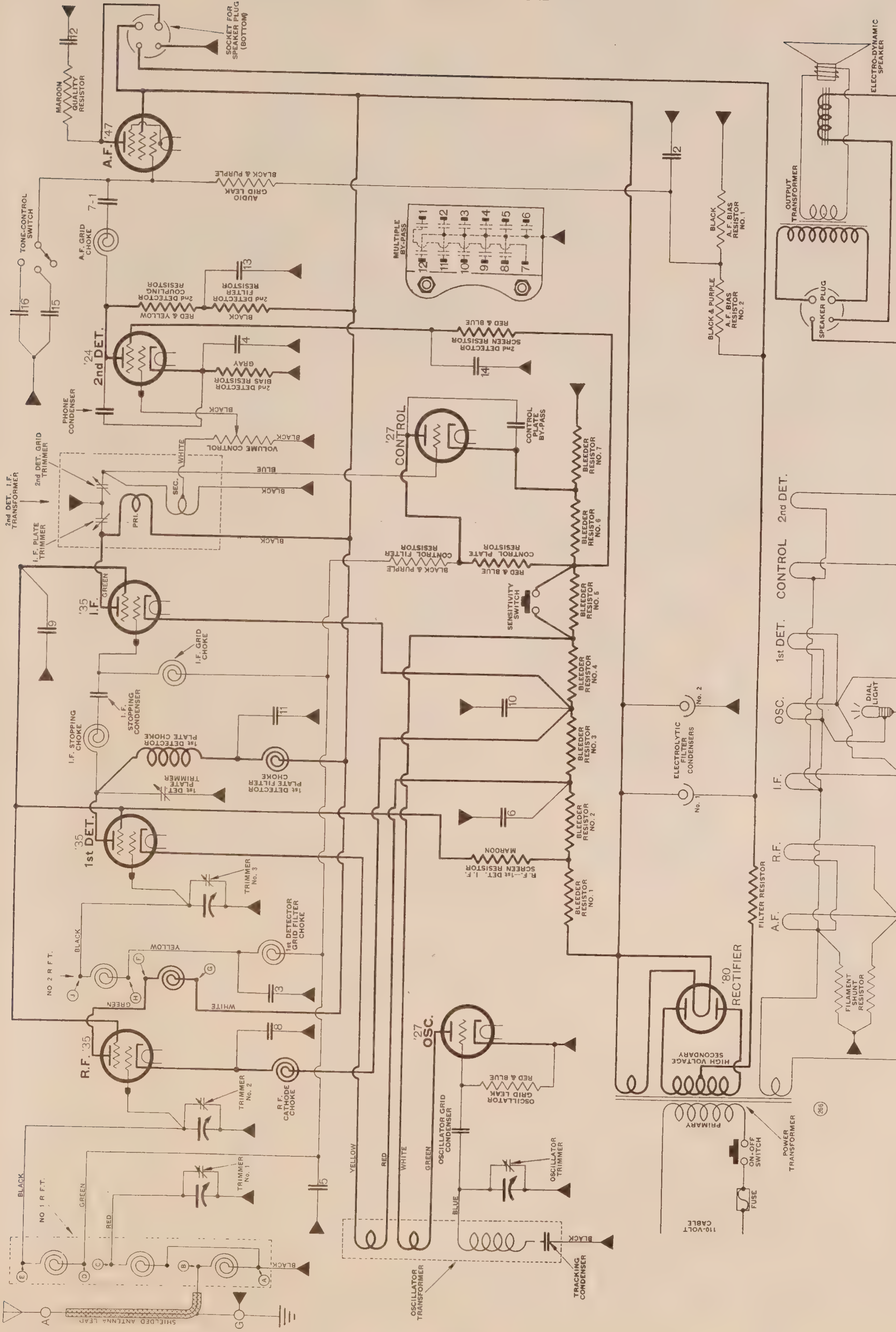
Tone-control Condenser

13—2nd-detector plate filter condenser.
14—2nd-detector screen by-pass.
15—Tone condenser.
16—Tone condenser.


R.F CATHODE CHOKE
1st DETECTOR GRID FILTER CHOKE
PHONE CONDENSER
MULTIPLE BY-PASS
VOLUME CONTROL & ON-OFF SWITCH
12
1
11
2
10
3
9
4
8
5
7
6
FUSE
FUSE SOCKET
13
15
14
16
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
FILTER RESISTOR
2nd DETECTOR FILTER RESISTOR
2nd DET.—I.F. TRANSFORMER
2nd DET. '24
BLACK
A.F. GRID CHOKE
2nd DETECTOR BIAS RESISTOR
CONTROL '27
I.F. '35
RED & YEL
TERMINAL BLOCK
GRAY
POWER TRANSFORMER
CONTROL PLATE RESISTOR
CONTROL PLATE BY-PASS
BLEEDER RESISTOR NO. 5
CONTROL FILTER RESISTOR
BLK. & PURPLE
NO. 1 R.F.T.
A
B
C
D
E
2nd DETECTOR COUPLING RESISTOR
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 7
OSCILLATOR TRANSFORMER
BLEEDER RESISTOR NO. 4
1st DETECTOR PLATE FILTER CHOKE
RED & BLUE
BLEEDER RES. NO. 6
TERMINAL BLOCKS
RECTIFIER '80
OSC. '27
ELECTROLYTIC FILTER CONDENSER NO. 2
2nd DETECTOR SCREEN RESISTOR
NO. 2 R.F.T.
H
G
J
F
OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
BLEEDER RES. NO. 2
BLEEDER RESISTOR NO. 1
MAROON
R.F. '35
A.F. '47
R. F.—1st DET.—I. F. SCREEN RESISTOR
1st DETECTOR PLATE TRIMMER
1st DET. '35
G
A
QUALITY RESISTOR
ELECTROLYTIC FILTER CONDENSER NO. 1
A. F. GRID LEAK
I.F. STOPPING CONDENSER
I.F. STOPPING CHOKE
A. F. BIAS RESISTOR NO. 2
A. F. BIAS RESISTOR NO. 1
SPEAKER
I.F. GRID CHOKE
1st DETECTOR PLATE CHOKE
FILAMENT SHUNT RESISTOR
267

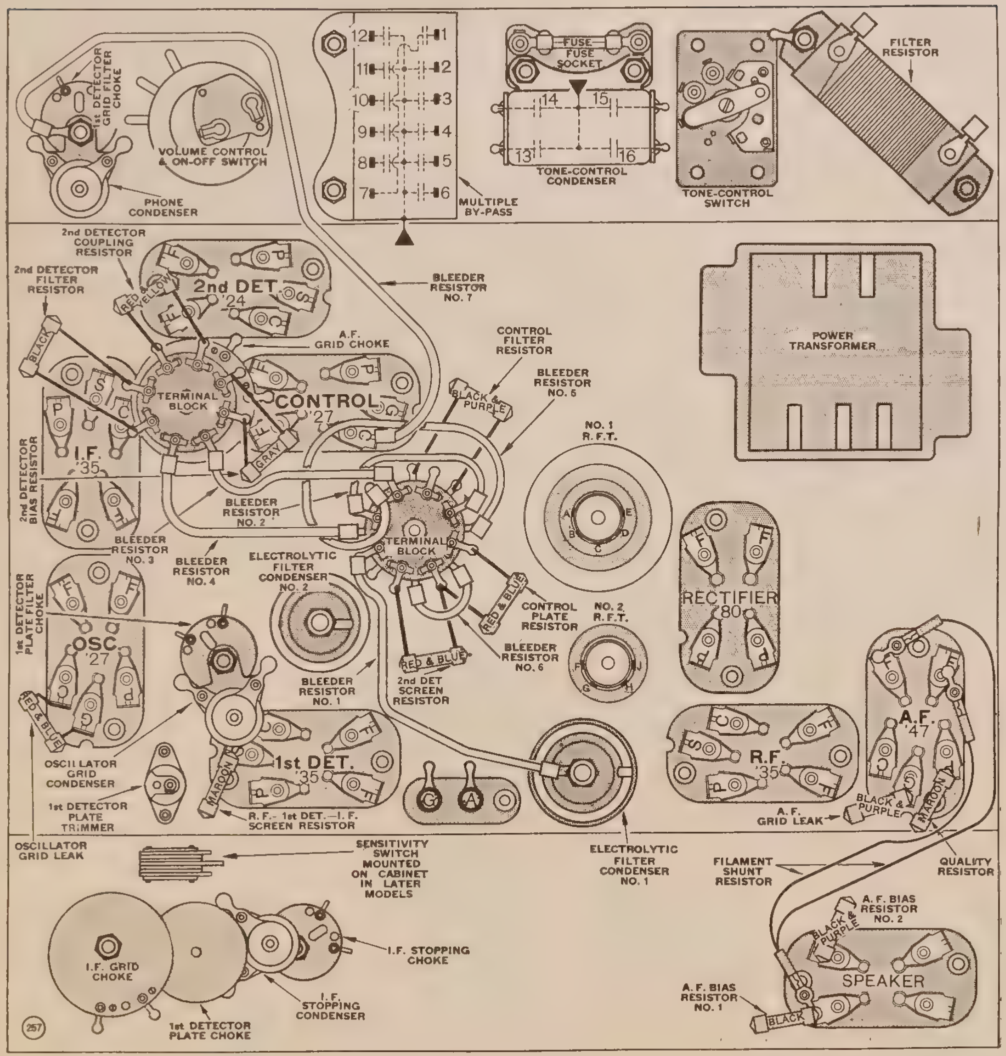
Bottom Chart of Late Type Model 92.

MODEL 92

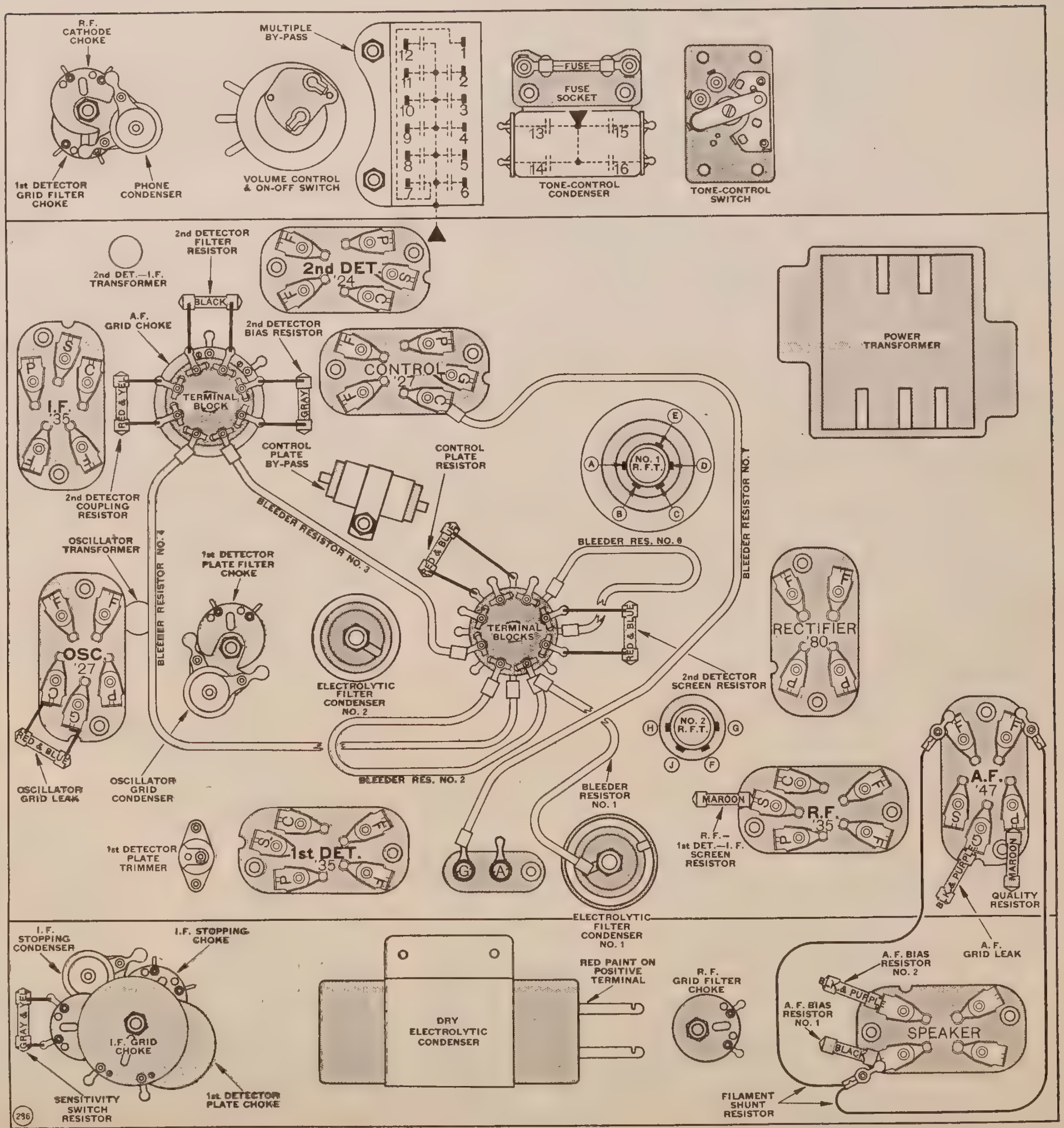

SOCKET FOR SPEAKER PLUG (BOTTOM)
MAROON QUALITY RESISTOR
12
A.F. '47
BLACK & PURPLE AUDIO GRID LEAK
7-1
A.F. GRID CHOKE
TONE-CONTROL SWITCH
16
15
RED & YELLOW 2nd DETECTOR COUPLING RESISTOR
BLACK 2nd DETECTOR FILTER RESISTOR
13
MULTIPLE BY-PASS
1 2 3 4 5 6 7 8 9 10 11 12
2nd DET. '24
4
GRAY 2nd DETECTOR BIAS RESISTOR
PHONE CONDENSER
BLACK
VOLUME CONTROL
BLACK
RED & BLUE 2nd DETECTOR SCREEN RESISTOR
14
'27 CONTROL
CONTROL PLATE BY-PASS
BLEEDER RESISTOR NO. 7
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
WHITE
SEC.
BLUE
BLACK
PRI.
BLACK
I.F. PLATE TRIMMER
BLEEDER RESISTOR NO. 6
RED & BLUE CONTROL PLATE RESISTOR
BLACK & PURPLE CONTROL FILTER RESISTOR
SENSITIVITY SWITCH
BLEEDER RESISTOR NO. 5
GREEN
'35 I.F.
9
I.F. GRID CHOKE
BLEEDER RESISTOR NO. 4
10
I.F. STOPPING CHOKE
I.F. STOPPING CONDENSER
11
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE FILTER CHOKE
1st DET. PLATE TRIMMER
BLEEDER RESISTOR NO. 3
6
BLEEDER RESISTOR NO. 2
'35 1st DET.
MAROON R.F.—1st DET., I.F. SCREEN RESISTOR
BLEEDER RESISTOR NO. 1
TRIMMER No. 3
ELECTROLYTIC FILTER CONDENSERS
No. 1
No. 2
FILTER RESISTOR
BLACK
YELLOW
1st DETECTOR GRID FILTER CHOKE
NO 2 R F T.
J F H G
3
GREEN
WHITE
R.F. '35
8
TRIMMER No. 2
R.F. CATHODE CHOKE
'27 OSC.
RED & BLUE OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE
BLACK
NO 1 R F.T.
GREEN
RED
TRIMMER No. 1
5
YELLOW
RED
WHITE
GREEN
BLUE
OSCILLATOR TRIMMER
E D C B A
BLACK
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
SHIELDED ANTENNA LEAD
A
G
BLACK & PURPLE A.F. BIAS RESISTOR NO. 2
BLACK A.F. BIAS RESISTOR NO. 1
2
OUTPUT TRANSFORMER
ELECTRO-DYNAMIC SPEAKER
SPEAKER PLUG
2nd DET.
CONTROL
1st DET.
OSC.
DIAL LIGHT
I.F.
R.F.
A.F.
FILAMENT SHUNT RESISTOR
266

The filter resistor (in the high-voltage center-tap lead) is not used in Model 92-F. The changes from early to late type consist of the addition of a choke in the R. F. **cathode**, the use of a separate control-plate by-pass, and a slight re-arrangement of leads to the **multiple by-pass.**

MODEL 92 (Early Type) CHART


1st DETECTOR GRID FILTER CHOKE
VOLUME CONTROL & ON-OFF SWITCH
PHONE CONDENSER
12
11
10
9
8
7
1
2
3
4
5
6
MULTIPLE BY-PASS
FUSE
FUSE SOCKET
14
15
13
16
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
FILTER RESISTOR
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
BLACK
RED & YELLOW
2nd DET '24
BLEEDER RESISTOR NO. 7
A. F. GRID CHOKE
CONTROL FILTER RESISTOR
BLACK & PURPLE
BLEEDER RESISTOR NO. 5
POWER TRANSFORMER
TERMINAL BLOCK
CONTROL '27
GRAY
I.F. '35
2nd DETECTOR BIAS RESISTOR
BLEEDER RESISTOR NO. 2
NO. 1 R.F.T.
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 4
ELECTROLYTIC FILTER CONDENSER NO. 2
TERMINAL BLOCK
RED & BLUE
CONTROL PLATE RESISTOR
NO. 2 R.F.T.
BLEEDER RESISTOR NO. 6
RECTIFIER '80
1st DETECTOR PLATE FILTER CHOKE
OSC. '27
2nd DET SCREEN RESISTOR
BLEEDER RESISTOR NO. 1
1st DET. '35
R.F. '35
A.F. '47
OSCILLATOR GRID CONDENSER
1st DETECTOR PLATE TRIMMER
MAROON
R. F.—1st DET.—I. F. SCREEN RESISTOR
G
A
A. F. GRID LEAK
BLACK & PURPLE
OSCILLATOR GRID LEAK
SENSITIVITY SWITCH MOUNTED ON CABINET IN LATER MODELS
ELECTROLYTIC FILTER CONDENSER NO. 1
FILAMENT SHUNT RESISTOR
QUALITY RESISTOR
A. F. BIAS RESISTOR NO. 2
I.F. STOPPING CHOKE
I.F. GRID CHOKE
I.F. STOPPING CONDENSER
SPEAKER
A. F. BIAS RESISTOR NO. 1
BLACK
1st DETECTOR PLATE CHOKE
257

MODEL 92-F CHART

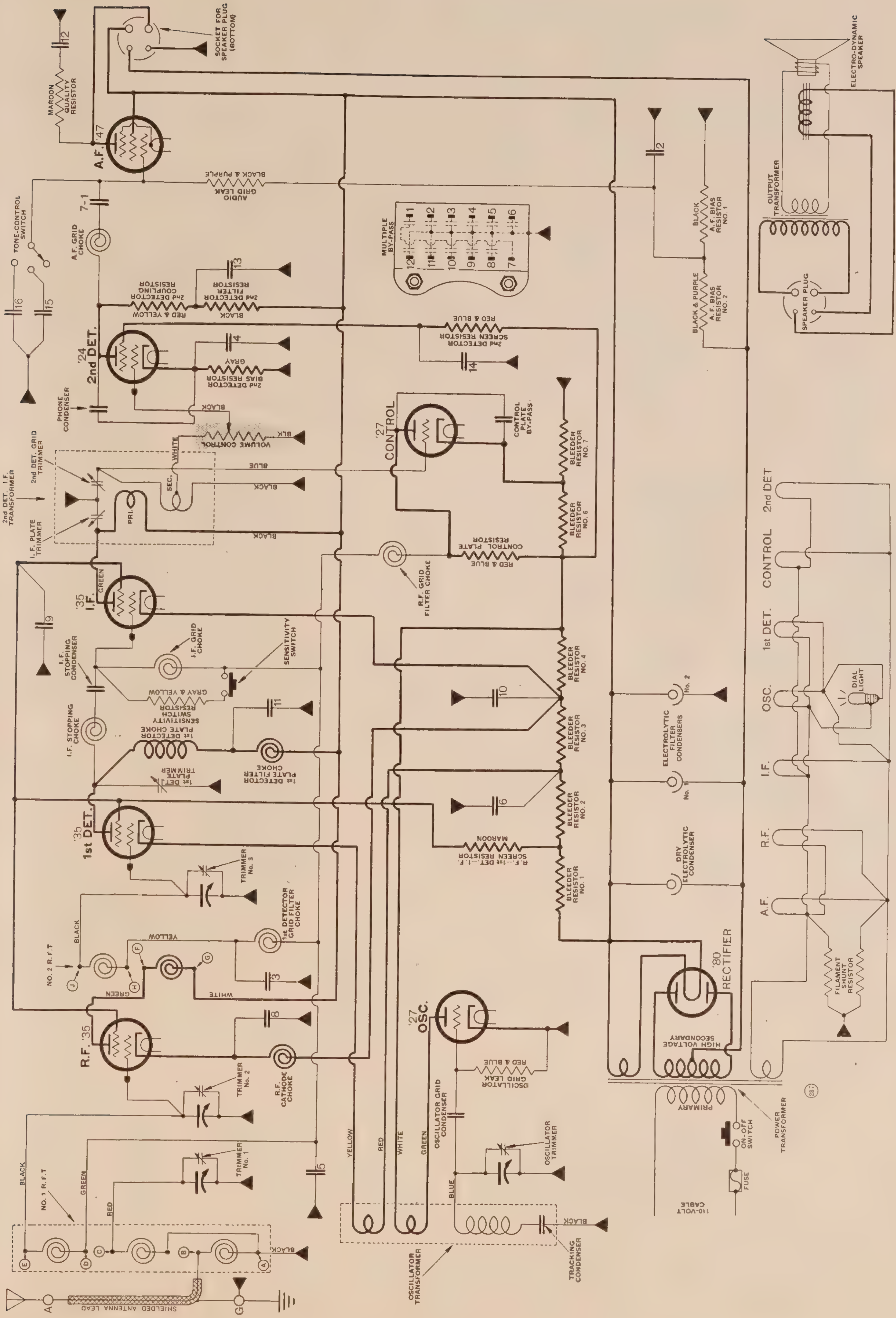

R.F. CATHODE CHOKE
MULTIPLE BY-PASS
1st DETECTOR GRID FILTER CHOKE
PHONE CONDENSER
VOLUME CONTROL & ON-OFF SWITCH
12
11
10
9
8
7
1
2
3
4
5
6
FUSE
FUSE SOCKET
13
15
14
16
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
2nd DET.—I.F. TRANSFORMER
2nd DETECTOR FILTER RESISTOR
BLACK
2nd DET. '24
A.F. GRID CHOKE
2nd DETECTOR BIAS RESISTOR
CONTROL '27
POWER TRANSFORMER
I.F. '35
RED & YEL
TERMINAL BLOCK
GRAY
CONTROL PLATE BY-PASS
CONTROL PLATE RESISTOR
2nd DETECTOR COUPLING RESISTOR
NO. 1 R.F.T.
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 7
OSCILLATOR TRANSFORMER
1st DETECTOR PLATE FILTER CHOKE
BLEEDER RESISTOR NO. 4
RED & BLUE
BLEEDER RES. NO. 6
TERMINAL BLOCKS
RECTIFIER '80
OSC. '27
2nd DETECTOR SCREEN RESISTOR
ELECTROLYTIC FILTER CONDENSER NO. 2
NO. 2 R.F.T.
OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
BLEEDER RES. NO. 2
BLEEDER RESISTOR NO. 1
MAROON
R.F. '35
A.F. '47
1st DETECTOR PLATE TRIMMER
1st DET. '35
G
A
R. F.—1st DET.—I. F. SCREEN RESISTOR
QUALITY RESISTOR
ELECTROLYTIC FILTER CONDENSER NO. 1
I.F. STOPPING CONDENSER
I.F. STOPPING CHOKE
GRAY & YEL
I.F. GRID CHOKE
RED PAINT ON POSITIVE TERMINAL
DRY ELECTROLYTIC CONDENSER
R.F. GRID FILTER CHOKE
A.F. GRID LEAK
A.F. BIAS RESISTOR NO. 2
A.F. BIAS RESISTOR NO. 1
BLK & PURPLE
SPEAKER
BLACK
SENSITIVITY SWITCH RESISTOR
1st DETECTOR PLATE CHOKE
FILAMENT SHUNT RESISTOR
296

By-pass Condensers in Early-Type Model 92

1—2nd-detector—A. F. coupling condenser.
2—A. F. bias by-pass.
3—1st-detector grid filter condenser.
4—2nd-detector bias by-pass.
5—R. F. grid filter condenser.
6—1st-detector bias by-pass.
7—2nd-detector—A. F. coupling condenser.
8—R. F.—I. F. bias by-pass.
9—R. F. 1st-detector—I. F. screen by-pass.
10—1st-detector plate filter condenser.
11—Control plate by-pass.
12—Quality condenser.

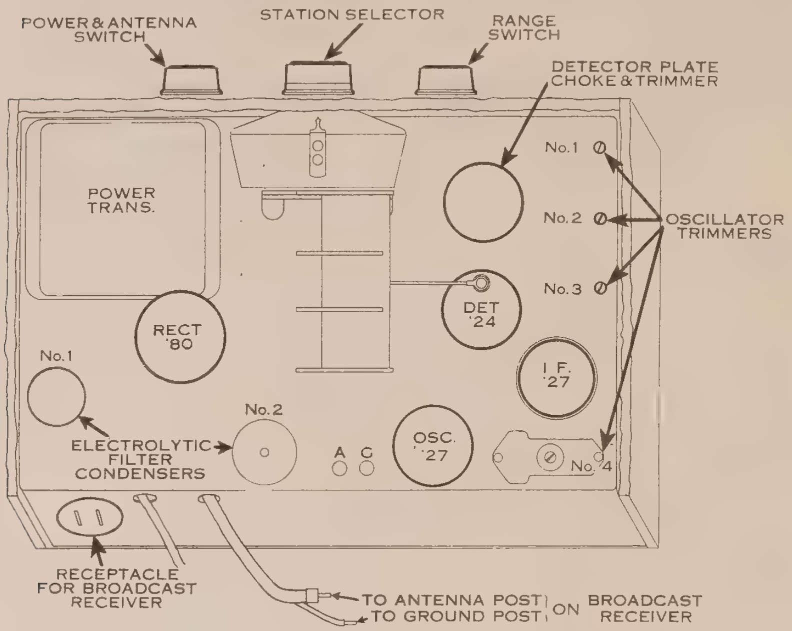
ATWATER KENT RADIO

MODEL 92-F

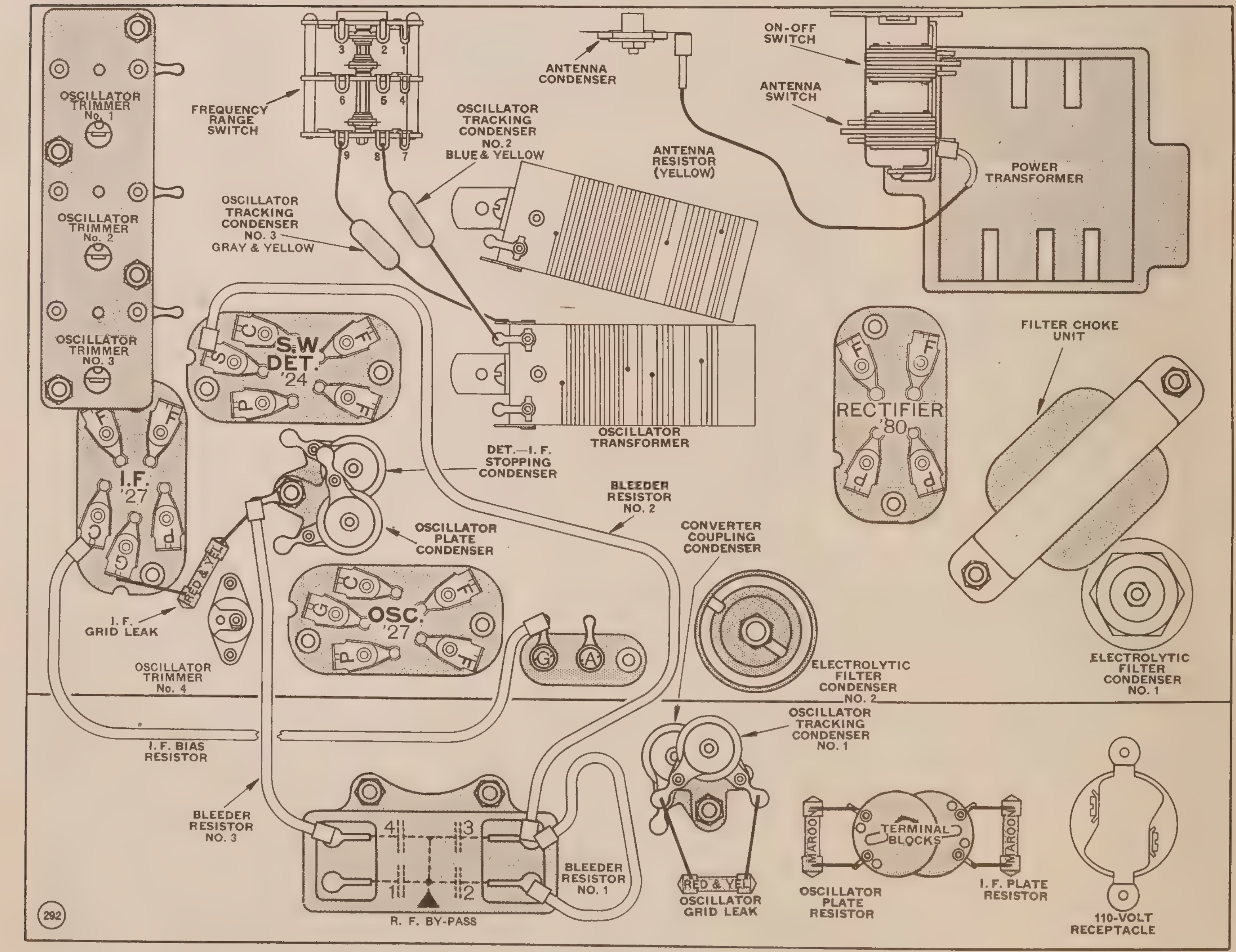

SOCKET FOR SPEAKER PLUG (BOTTOM)
MAROON
QUALITY RESISTOR
12
A.F. '47
AUDIO GRID LEAK
BLACK & PURPLE
TONE-CONTROL SWITCH
A.F. GRID CHOKE
7-1
16
15
2nd DETECTOR COUPLING RESISTOR
RED & YELLOW
2nd DETECTOR FILTER RESISTOR
BLACK
13
2nd DET. '24
4
2nd DETECTOR BIAS RESISTOR
GRAY
PHONE CONDENSER
BLACK
VOLUME CONTROL
BLK
WHITE
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
SEC.
PRI.
BLUE
I.F. PLATE TRIMMER
'35 I.F.
GREEN
9
I.F. STOPPING CONDENSER
I.F. GRID CHOKE
SENSITIVITY SWITCH
GRAY & YELLOW
SENSITIVITY SWITCH RESISTOR
11
I.F. STOPPING CHOKE
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE FILTER CHOKE
1st DET. PLATE TRIMMER
'35 1st DET.
TRIMMER No. 3
1st DETECTOR GRID FILTER CHOKE
YELLOW
NO. 2 R.F.T.
3
WHITE
GREEN
'35 R.F.
8
R.F. CATHODE CHOKE
TRIMMER No. 2
TRIMMER No. 1
NO. 1 R.F.T.
BLACK
GREEN
RED
5
SHIELDED ANTENNA LEAD
A
G
YELLOW
RED
WHITE
GREEN
OSCILLATOR TRANSFORMER
BLUE
OSCILLATOR GRID CONDENSER
'27 OSC.
OSCILLATOR GRID LEAK
RED & BLUE
OSCILLATOR TRIMMER
TRACKING CONDENSER
MULTIPLE BY-PASS
2nd DETECTOR SCREEN RESISTOR
RED & BLUE
14
'27 CONTROL
CONTROL PLATE BY-PASS
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
CONTROL PLATE RESISTOR
R.F. GRID FILTER CHOKE
BLEEDER RESISTOR NO. 4
10
BLEEDER RESISTOR NO. 3
6
BLEEDER RESISTOR NO. 2
MAROON
R.F.—1st DET.—I.F. SCREEN RESISTOR
BLEEDER RESISTOR NO. 1
A.F. BIAS RESISTOR NO. 1
A.F. BIAS RESISTOR NO. 2
BLACK & PURPLE
ELECTROLYTIC FILTER CONDENSERS
No. 1
No. 2
DRY ELECTROLYTIC CONDENSER
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
A.F.
R.F.
I.F.
OSC.
1st DET.
CONTROL
2nd DET
DIAL LIGHT
FILAMENT SHUNT RESISTOR

The differences in this circuit, compared to the 60-cycle Model 92, are the omission of bleeder No. 5, the addition of a dry electrolytic filter condenser, and location of the sensitivity switch in the I. F. grid circuit instead of in the bleeder circuit.

MODEL 93 SHORT WAVE CONVERTER


POWER & ANTENNA SWITCH
STATION SELECTOR
RANGE SWITCH
DETECTOR PLATE CHOKE & TRIMMER
POWER TRANS.
No.1
No.2
No.3
OSCILLATOR TRIMMERS
DET '24
RECT '80
I.F. '27
No.1
ELECTROLYTIC FILTER CONDENSERS
No.2
A G
OSC. '27
No. 4
RECEPTACLE FOR BROADCAST RECEIVER
TO ANTENNA POST
TO GROUND POST
ON BROADCAST RECEIVER

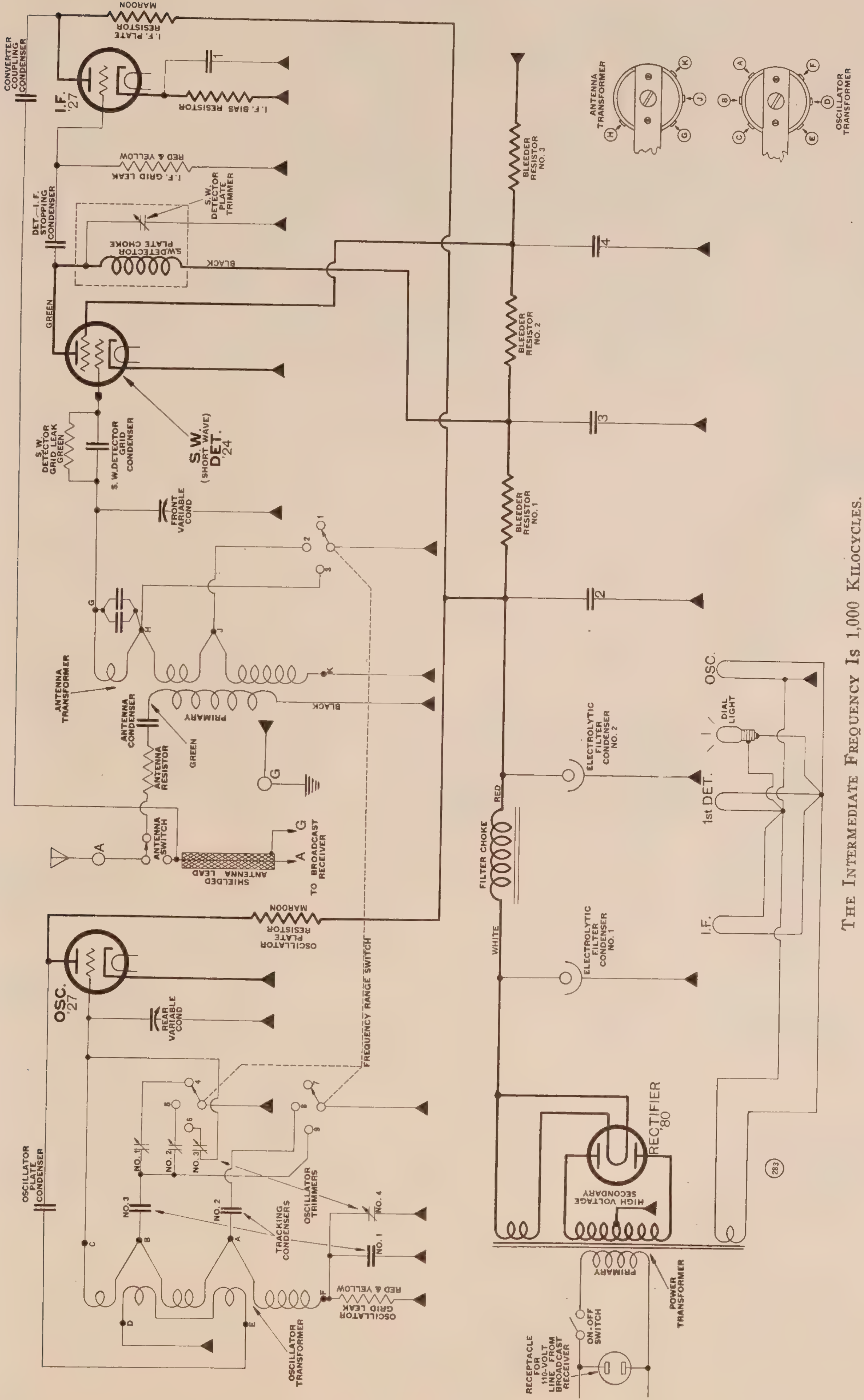
Top View.


OSCILLATOR TRIMMER No. 1
OSCILLATOR TRIMMER No. 2
OSCILLATOR TRIMMER NO. 3
FREQUENCY RANGE SWITCH
3 2 1
6 5 4
9 8 7
ANTENNA CONDENSER
ON-OFF SWITCH
ANTENNA SWITCH
OSCILLATOR TRACKING CONDENSER NO. 2 BLUE & YELLOW
ANTENNA RESISTOR (YELLOW)
POWER TRANSFORMER
OSCILLATOR TRACKING CONDENSER NO. 3 GRAY & YELLOW
S.W. DET. '24
C S F F P F
OSCILLATOR TRANSFORMER
RECTIFIER '80
F F P P
FILTER CHOKE UNIT
I.F. '27
F F C P G
DET.—I. F. STOPPING CONDENSER
BLEEDER RESISTOR NO. 2
OSCILLATOR PLATE CONDENSER
CONVERTER COUPLING CONDENSER
RED & YEL
I. F. GRID LEAK
OSC. '27
C F G P F
G A
ELECTROLYTIC FILTER CONDENSER NO. 2
ELECTROLYTIC FILTER CONDENSER NO. 1
OSCILLATOR TRIMMER No. 4
I.F. BIAS RESISTOR
OSCILLATOR TRACKING CONDENSER NO. 1
BLEEDER RESISTOR NO. 3
4 3 1 2
BLEEDER RESISTOR NO. 1
R. F. BY-PASS
RED & YEL
OSCILLATOR GRID LEAK
MAROON
TERMINAL BLOCKS
MAROON
OSCILLATOR PLATE RESISTOR
I.F. PLATE RESISTOR
110-VOLT RECEPTACLE
292

Bottom Chart.

In servicing this converter, do not change the original position of the wiring as it will disturb the dial calibration. An antenna choke, No. 26510, not shown above, is connected across the antenna condenser in some Model 93 converters.

MODEL 93 SHORT WAVE CONVERTER

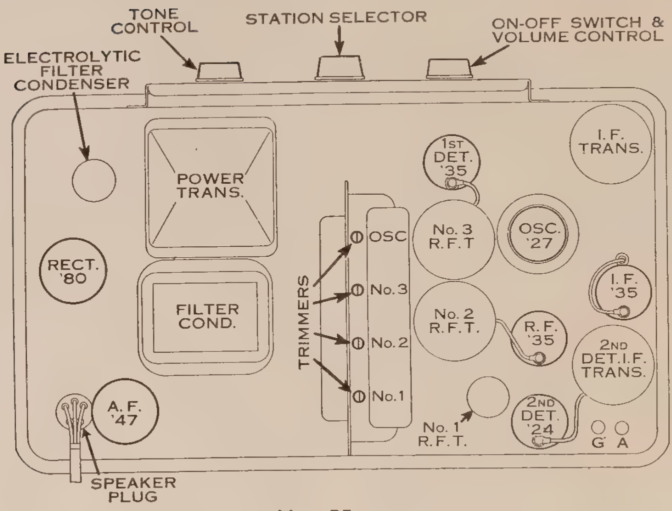

I.F. PLATE RESISTOR MAROON
CONVERTER COUPLING CONDENSER
I.F. '27
I.F. BIAS RESISTOR
I.F. GRID LEAK RED & YELLOW
DET.—I.F. STOPPING CONDENSER
S.W. DETECTOR PLATE TRIMMER
S.W. DETECTOR PLATE CHOKE
BLACK
GREEN
S.W. (SHORT WAVE) DET. '24
S.W. DETECTOR GRID LEAK GREEN
S.W. DETECTOR GRID CONDENSER
FRONT VARIABLE COND
ANTENNA TRANSFORMER
PRIMARY
ANTENNA CONDENSER
ANTENNA RESISTOR
ANTENNA SWITCH
SHIELDED ANTENNA LEAD
TO BROADCAST RECEIVER
OSCILLATOR PLATE RESISTOR MAROON
FREQUENCY RANGE SWITCH
OSC. '27
REAR VARIABLE COND
OSCILLATOR PLATE CONDENSER
OSCILLATOR TRIMMERS
TRACKING CONDENSERS
OSCILLATOR TRANSFORMER
OSCILLATOR GRID LEAK RED & YELLOW
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
FILTER CHOKE
RED
WHITE
ELECTROLYTIC FILTER CONDENSER NO. 2
ELECTROLYTIC FILTER CONDENSER NO. 1
OSC.
DIAL LIGHT
1st DET.
I.F.
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
RECEPTACLE FOR 110-VOLT LINE FROM BROADCAST RECEIVER
283

THE INTERMEDIATE FREQUENCY IS 1,000 KILOCYCLES.

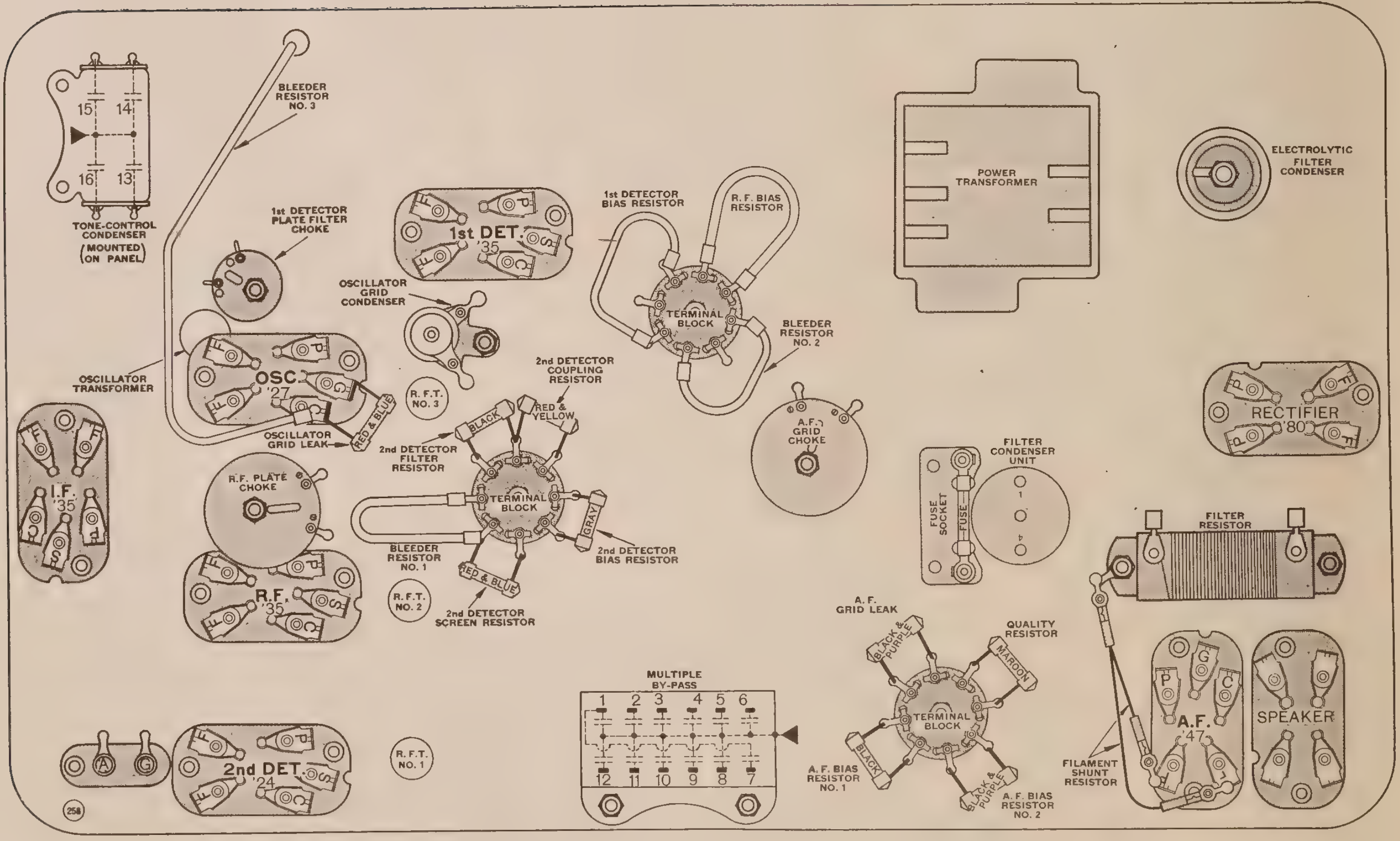
The two fixed condensers across contacts G and H of the antenna transformer are listed as "compensating condensers" in the parts list. In a few early-type sets, a paper-and-foil condenser is used instead of electrolytic filter condenser No. 1.

In some Model 93 converters, an antenna choke, not shown above, is connected across the antenna condenser. This choke is No. 26510.

MODEL 94, 94-F


TONE CONTROL
STATION SELECTOR
ON-OFF SWITCH & VOLUME CONTROL
ELECTROLYTIC FILTER CONDENSER
POWER TRANS.
RECT. '80
FILTER COND.
A. F. '47
SPEAKER PLUG
TRIMMERS
OSC
No. 3
No. 2
No. 1
1ST DET. '35
No. 3 R.F.T
OSC. '27
No. 2 R.F.T.
R.F. '35
No. 1 R.F.T.
2ND DET. '24
I. F. TRANS.
I. F. '35
2ND DET. I. F. TRANS.
G
A

Top View.


15
14
16
13
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
BLEEDER RESISTOR NO. 3
1st DETECTOR PLATE FILTER CHOKE
OSCILLATOR TRANSFORMER
1st DET. '35
OSCILLATOR GRID CONDENSER
OSC. '27
OSCILLATOR GRID LEAK
RED & BLUE
R. F. T. NO. 3
I.F. '35
R.F. PLATE CHOKE
R.F. '35
2nd DETECTOR COUPLING RESISTOR
BLACK
RED & YELLOW
2nd DETECTOR FILTER RESISTOR
TERMINAL BLOCK
GRAY
BLEEDER RESISTOR NO. 1
2nd DETECTOR BIAS RESISTOR
RED & BLUE
R. F. T. NO. 2
2nd DETECTOR SCREEN RESISTOR
A
G
2nd DET. '24
R. F. T. NO. 1
258
1st DETECTOR BIAS RESISTOR
R. F. BIAS RESISTOR
TERMINAL BLOCK
BLEEDER RESISTOR NO. 2
A.F. GRID CHOKE
MULTIPLE BY-PASS
1 2 3 4 5 6
12 11 10 9 8 7
POWER TRANSFORMER
ELECTROLYTIC FILTER CONDENSER
RECTIFIER '80
FILTER CONDENSER UNIT
FUSE SOCKET
FUSE
FILTER RESISTOR
A. F. GRID LEAK
BLACK & PURPLE
QUALITY RESISTOR
MAROON
TERMINAL BLOCK
BLACK
A. F. BIAS RESISTOR NO. 1
BLACK & PURPLE
A. F. BIAS RESISTOR NO. 2
FILAMENT SHUNT RESISTOR
A.F. '47
SPEAKER

Bottom Chart.

The filter resistor is not used in Model 94-F.

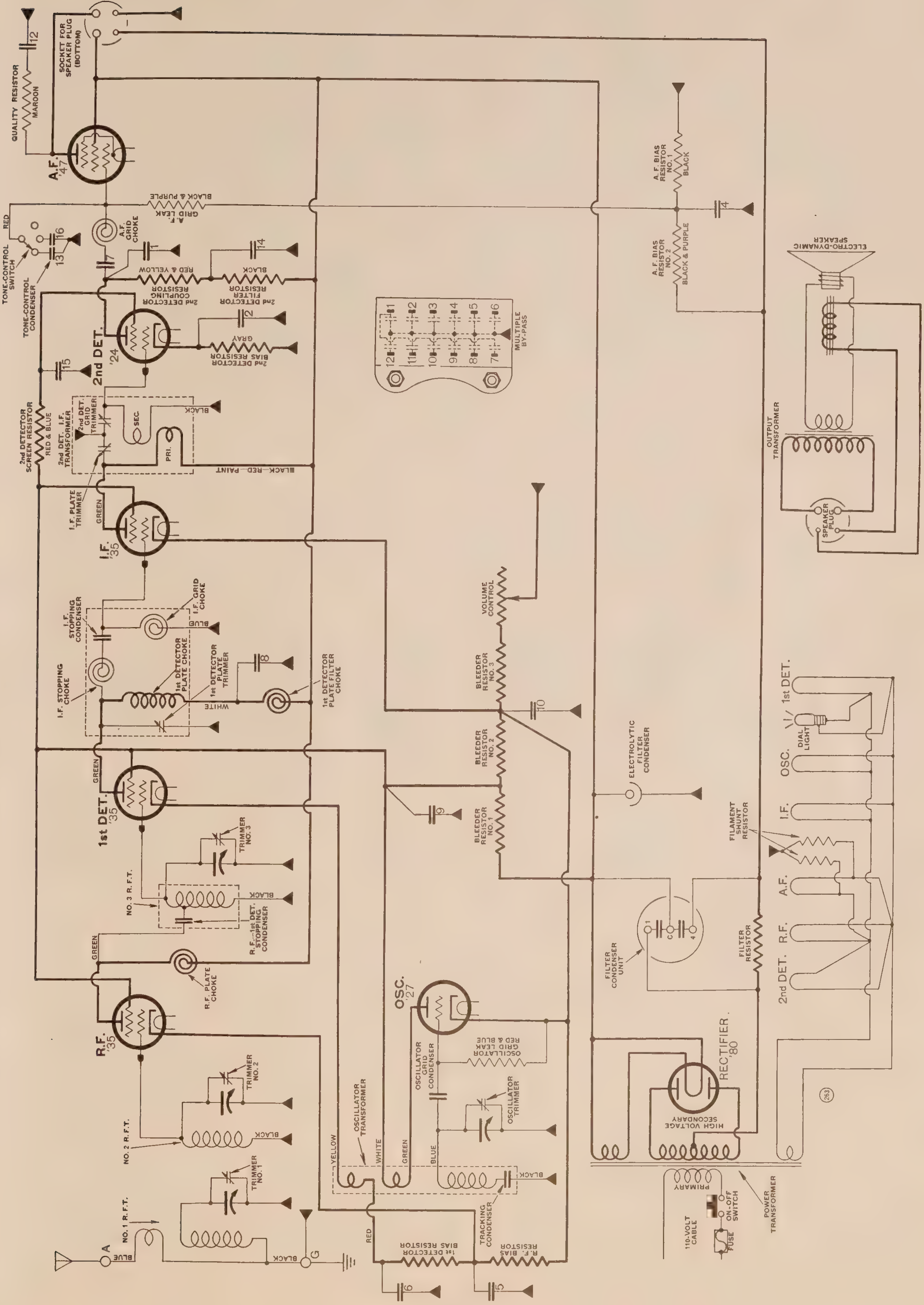
Condensers in Multiple By-pass

1—Phone condenser.
2—2nd-detector bias by-pass.
3—Not used.
4—A. F. bias by-pass.
5—R. F. bias by-pass.
6—1st-detector bias by-pass.
7—2nd-detector—A. F. coupling condenser.
8—1st-detector plate filter condenser.
9—R. F. 1st-detector—I. F. screen by-pass.
10—I. F. bias by-pass.
11—Not used.
12—Quality condenser.

Tone-control Condenser
(on panel)

13—Tone condenser.
14—2nd-detector plate filter condenser.
15—2nd-detector screen by-pass.
16—Tone condenser.

MODEL 94, 94-F


SOCKET FOR SPEAKER PLUG (BOTTOM)
QUALITY RESISTOR
MAROON
12
A.F. '47
A.F. GRID LEAK
BLACK & PURPLE
RED
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
A.F. GRID CHOKE
2nd DETECTOR COUPLING RESISTOR
RED & YELLOW
2nd DETECTOR FILTER RESISTOR
BLACK
2nd DET. '24
2nd DETECTOR BIAS RESISTOR
GRAY
2nd DETECTOR SCREEN RESISTOR
RED & BLUE
2nd DET. I.F. TRANSFORMER
2nd DET. GRID TRIMMER
SEC
PRI.
BLACK—RED—PAINT
I.F. PLATE TRIMMER
GREEN
I.F. '35
I.F. STOPPING CONDENSER
I.F. GRID CHOKE
BLUE
I.F. STOPPING CHOKE
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
WHITE
1st DETECTOR PLATE FILTER CHOKE
1st DET. '35
TRIMMER NO. 3
NO. 3 R.F.T.
R.F.—1st DET. STOPPING CONDENSER
R.F. PLATE CHOKE
R.F. '35
TRIMMER NO. 2
NO. 2 R.F.T.
TRIMMER NO. 1
NO. 1 R.F.T.
A
G
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK
RED & BLUE
OSCILLATOR TRIMMER
OSCILLATOR TRANSFORMER
YELLOW
GREEN
TRACKING CONDENSER
1st DETECTOR BIAS RESISTOR
R.F. BIAS RESISTOR
MULTIPLE BY-PASS
VOLUME CONTROL
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
ELECTROLYTIC FILTER CONDENSER
FILTER CONDENSER UNIT
A.F. BIAS RESISTOR NO. 1
A.F. BIAS RESISTOR NO. 2
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
FILAMENT SHUNT RESISTOR
FILTER RESISTOR
1st DET.
DIAL LIGHT
OSC.
I.F.
A.F.
R.F.
2nd DET.
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
ON-OFF SWITCH
110-VOLT CABLE
FUSE
POWER TRANSFORMER
263

The filter resistor (in the high-voltage center-tap lead) is not used in Model 94-F.

MODEL 96, 96-F TOP VIEW

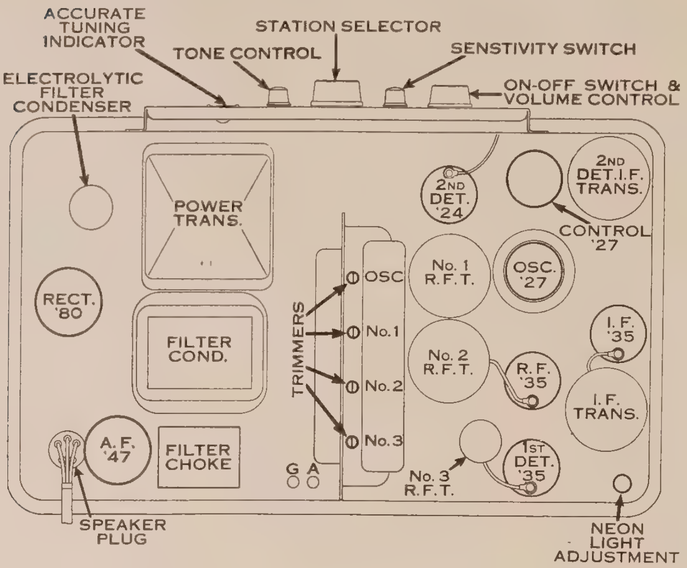
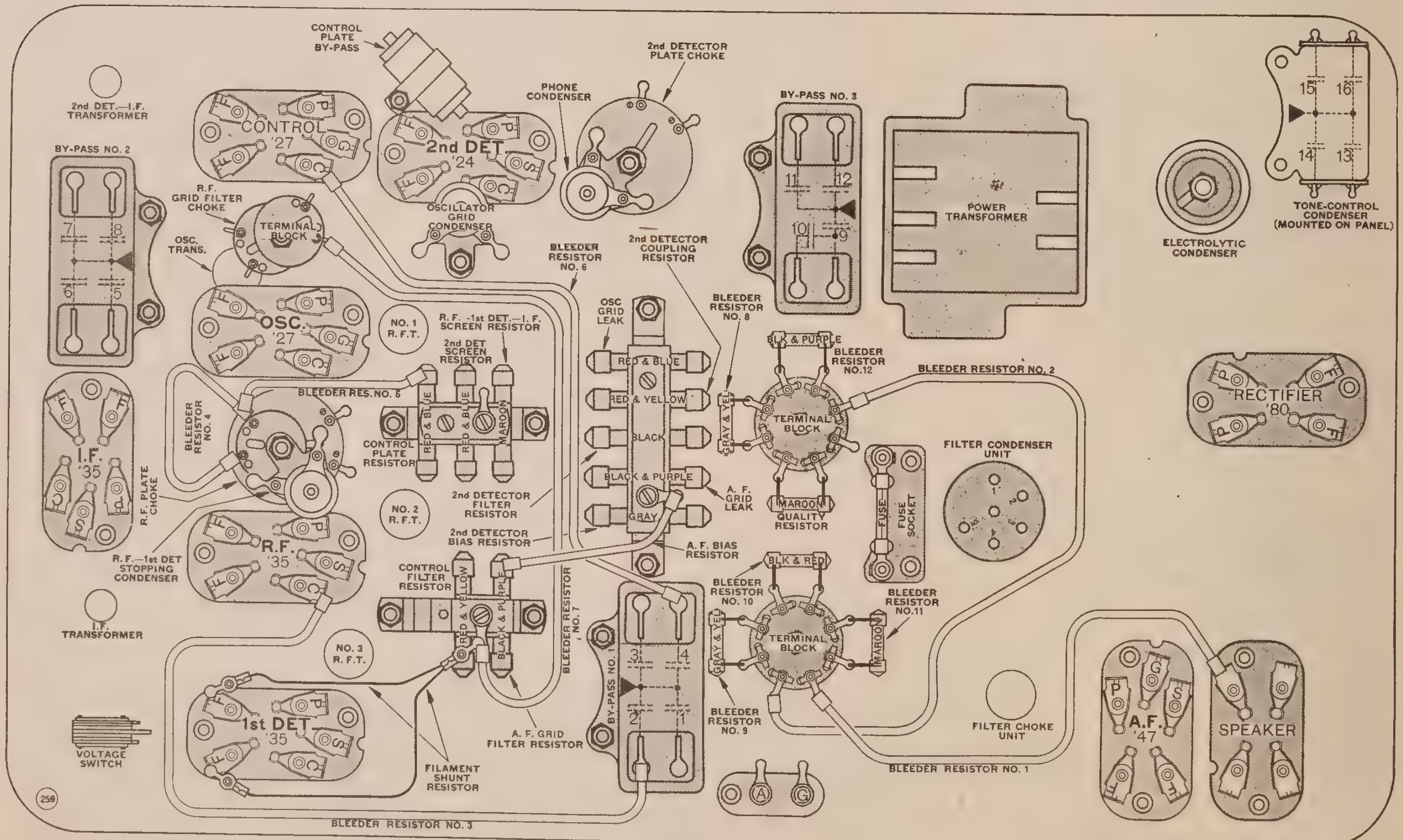

ACCURATE TUNING INDICATOR
STATION SELECTOR
TONE CONTROL
SENSTIVITY SWITCH
ELECTROLYTIC FILTER CONDENSER
ON-OFF SWITCH & VOLUME CONTROL
POWER TRANS.
2ND DET. '24
2ND DET. I.F. TRANS.
CONTROL '27
RECT. '80
OSC
No. 1
No. 2
No. 3
TRIMMERS
No. 1 R.F.T.
OSC. '27
FILTER COND.
No. 2 R.F.T.
I.F. '35
R.F. '35
I.F. TRANS.
A.F. '47
FILTER CHOKE
G A
No. 3 R.F.T.
1ST DET. '35
SPEAKER PLUG
NEON LIGHT ADJUSTMENT

CHART OF MODEL 96 (1st Type) Below Serial No. 7289385


CONTROL PLATE BY-PASS
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
BY-PASS NO. 3
2nd DET.—I.F. TRANSFORMER
CONTROL '27
2nd DET. '24
BY-PASS NO. 2
R.F. GRID FILTER CHOKE
TERMINAL BLOCK
OSC. TRANS.
OSCILLATOR GRID CONDENSER
BLEEDER RESISTOR NO. 6
2nd DETECTOR COUPLING RESISTOR
11
12
10
9
7
8
6
5
POWER TRANSFORMER
ELECTROLYTIC CONDENSER
15
16
14
13
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
OSC. '27
NO. 1 R.F.T.
R. F. -1st DET.—I. F. SCREEN RESISTOR
2nd DET SCREEN RESISTOR
OSC GRID LEAK
BLEEDER RESISTOR NO. 8
BLK & PURPLE
BLEEDER RESISTOR NO.12
BLEEDER RESISTOR NO. 2
RED & BLUE
RED & YELLOW
BLACK
BLACK & PURPLE
GRAY
GRAY & YEL
TERMINAL BLOCK
RECTIFIER '80
BLEEDER RES. NO. 5
BLEEDER RESISTOR NO. 4
CONTROL PLATE RESISTOR
MAROON
I.F. '35
R.F. PLATE CHOKE
A. F. GRID LEAK
QUALITY RESISTOR
FUSE
FUSE SOCKET
FILTER CONDENSER UNIT
NO. 2 R.F.T.
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR BIAS RESISTOR
A. F. BIAS RESISTOR
R.F.—1st DET STOPPING CONDENSER
R.F. '35
CONTROL FILTER RESISTOR
BLK & RED
BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO.11
I.F. TRANSFORMER
NO. 3 R.F.T.
RED & YELLOW
BLACK & PURPLE
BLEEDER RESISTOR NO. 7
BY-PASS NO. 1
3
4
2
1
TERMINAL BLOCK
BLEEDER RESISTOR NO. 9
FILTER CHOKE UNIT
A.F. '47
SPEAKER
1st DET. '35
VOLTAGE SWITCH
FILAMENT SHUNT RESISTOR
A. F. GRID FILTER RESISTOR
BLEEDER RESISTOR NO. 1
A
G
259
BLEEDER RESISTOR NO. 3

By-pass No. 1

1—2nd-detector plate filter condenser.
2—1st-detector bias by-pass.
3—R. F. 1st-detector — I. F. screen by-pass.
4—Control plate filter condenser.

By-pass No. 2

5—A. F. grid filter condenser.
6—R. F.—I. F. bias by-pass.
7—1st-detector—I. F. grid filter condenser.
8—R. F. grid filter condenser.

By-pass No. 3

9—Phone condenser.
10—2nd-detector — A. F. coupling condenser.
11—2nd-detector bias by-pass.
12—Quality condenser.

Tone-control Condenser (on panel)

13—Tone condenser.
14—Tone condenser.
15—2nd-detector screen by-pass.
16—Not used.

MODEL 96 (1st Type) Below Serial No. 7289385

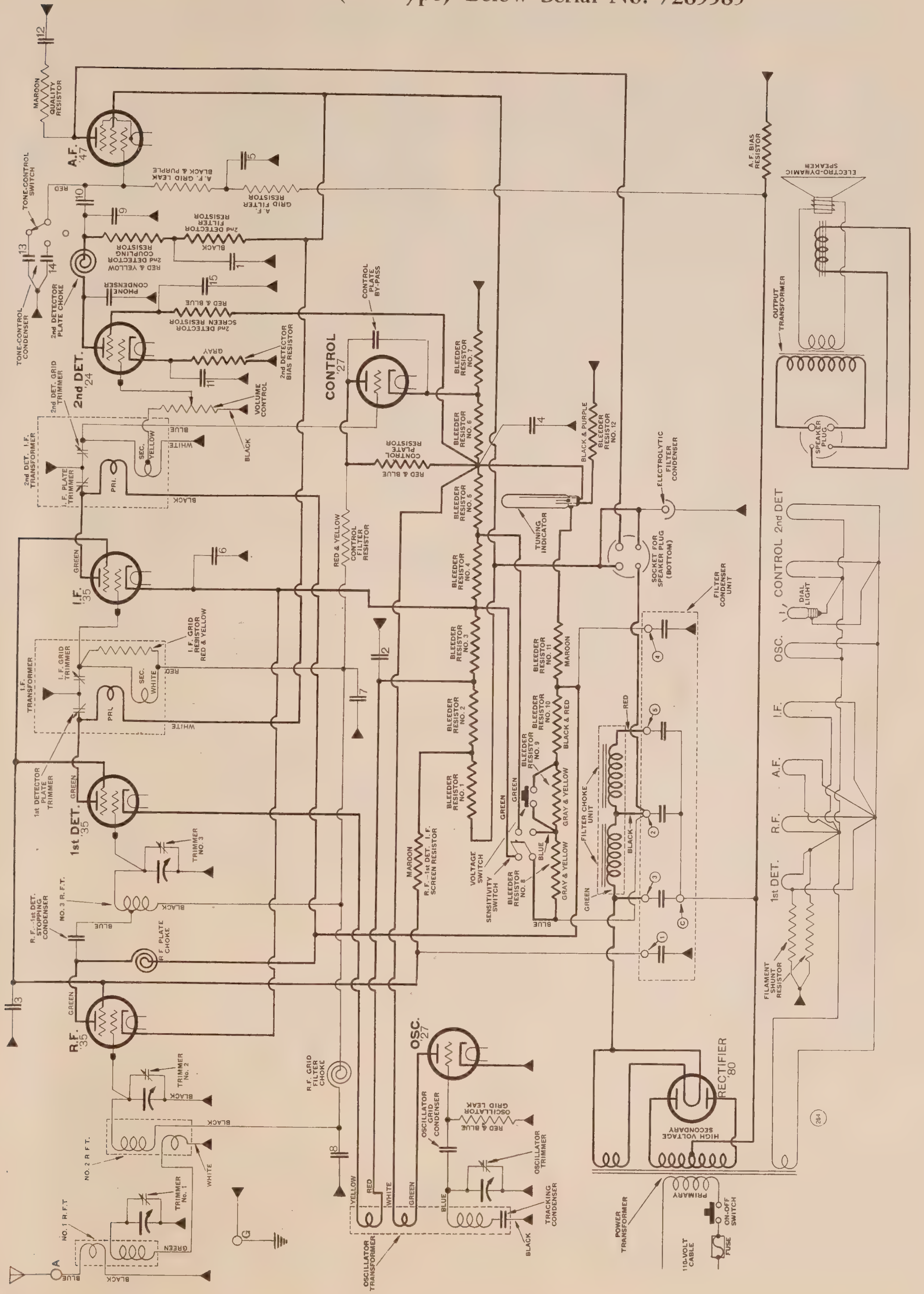

12
MAROON QUALITY RESISTOR
A.F. '47
TONE-CONTROL SWITCH
RED
10
BLACK & PURPLE A.F. GRID LEAK
5
A.F. GRID FILTER RESISTOR
9
13
14
BLACK 2nd DETECTOR FILTER RESISTOR
RED & YELLOW 2nd DETECTOR COUPLING RESISTOR
1
TONE-CONTROL CONDENSER
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
15
RED & BLUE 2nd DETECTOR SCREEN RESISTOR
GRAY
2nd DETECTOR BIAS RESISTOR
11
2nd DET. '24
2nd DET. GRID TRIMMER
VOLUME CONTROL
BLACK
CONTROL PLATE BY-PASS
CONTROL '27
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
CONTROL PLATE RESISTOR RED & BLUE
4
BLACK & PURPLE BLEEDER RESISTOR NO. 12
ELECTROLYTIC FILTER CONDENSER
2nd DET. I.F. TRANSFORMER
I.F. PLATE TRIMMER
PRI.
SEC.
YELLOW
WHITE
BLUE
BLACK
GREEN
I.F. '35
6
RED & YELLOW CONTROL FILTER RESISTOR
BLEEDER RESISTOR NO. 5
TUNING INDICATOR
SOCKET FOR SPEAKER PLUG (BOTTOM)
BLEEDER RESISTOR NO. 4
FILTER CONDENSER UNIT
I.F. GRID RESISTOR RED & YELLOW
I.F. TRANSFORMER
I.F. GRID TRIMMER
2
7
RED
WHITE
PRI.
SEC.
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 11
MAROON
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 10
BLACK & RED
BLEEDER RESISTOR NO. 9
GRAY & YELLOW
BLEEDER RESISTOR NO. 1
1st DETECTOR PLATE TRIMMER
1st DET. '35
TRIMMER NO. 3
GREEN
VOLTAGE SWITCH
SENSITIVITY SWITCH
BLEEDER RESISTOR NO. 8
BLUE
GRAY & YELLOW
FILTER CHOKE UNIT
RED
BLACK
GREEN
④
⑤
②
③
①
Ⓒ
MAROON R.F.—1st DET. I.F. SCREEN RESISTOR
NO. 3 R.F.T.
BLACK
BLUE
R.F.—1st DET. STOPPING CONDENSER
R.F. PLATE CHOKE
3
GREEN
R.F. '35
TRIMMER NO. 2
BLACK
NO. 2 R.F.T.
WHITE
R.F. GRID FILTER CHOKE
8
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR TRIMMER
TRACKING CONDENSER
BLACK
OSCILLATOR TRANSFORMER
YELLOW
RED
WHITE
GREEN
BLUE
TRIMMER No. 1
NO. 1 R.F.T.
GREEN
A
BLUE
BLACK
G
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
ON-OFF SWITCH
FUSE
110-VOLT CABLE
POWER TRANSFORMER
A.F. BIAS RESISTOR
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
CONTROL
2nd DET
DIAL LIGHT
OSC.
I.F.
A.F.
R.F.
1st DET.
FILAMENT SHUNT RESISTOR
284

CHART OF MODEL 96 (2nd Type) Serial Nos. 7289385 to 7291674

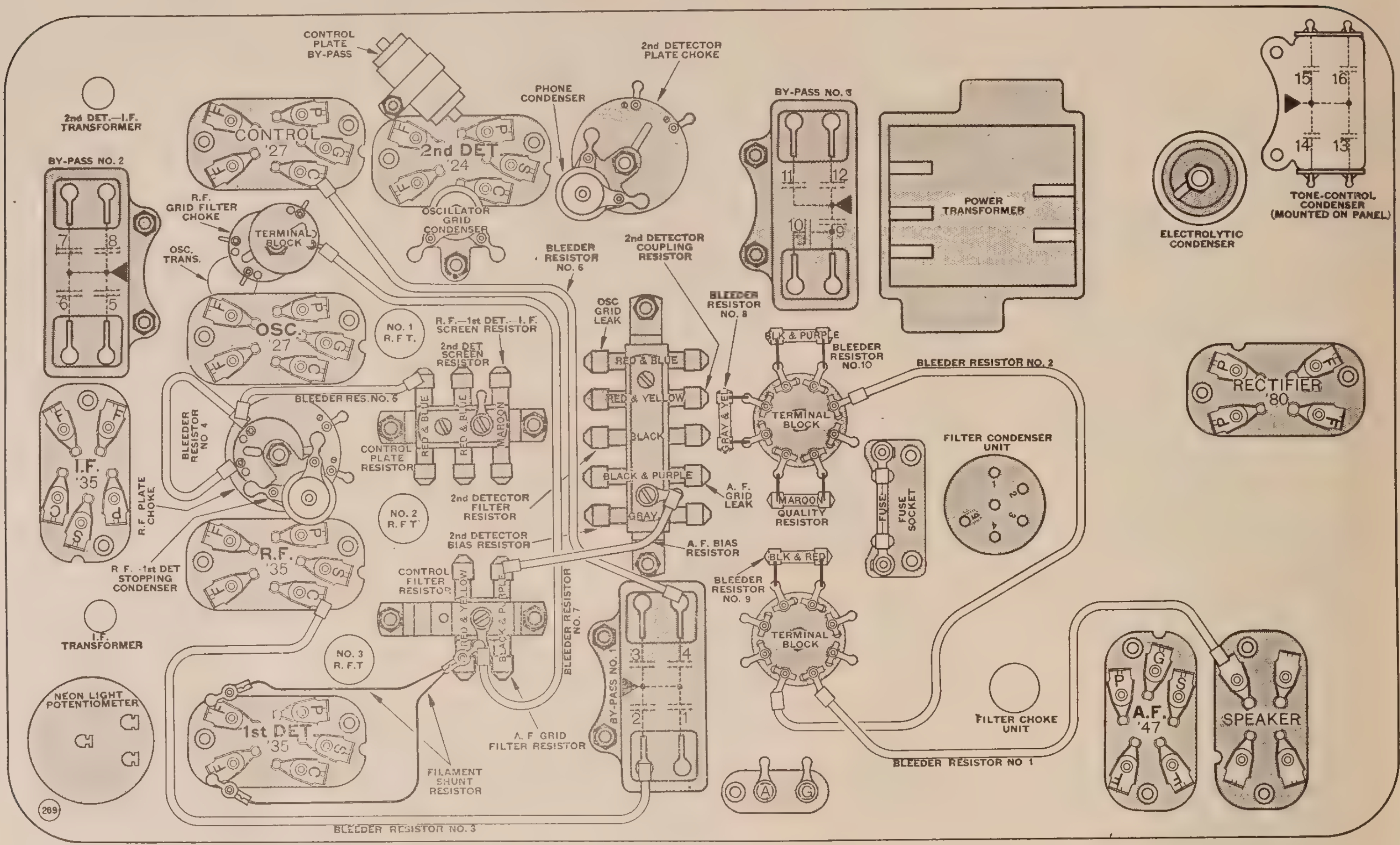
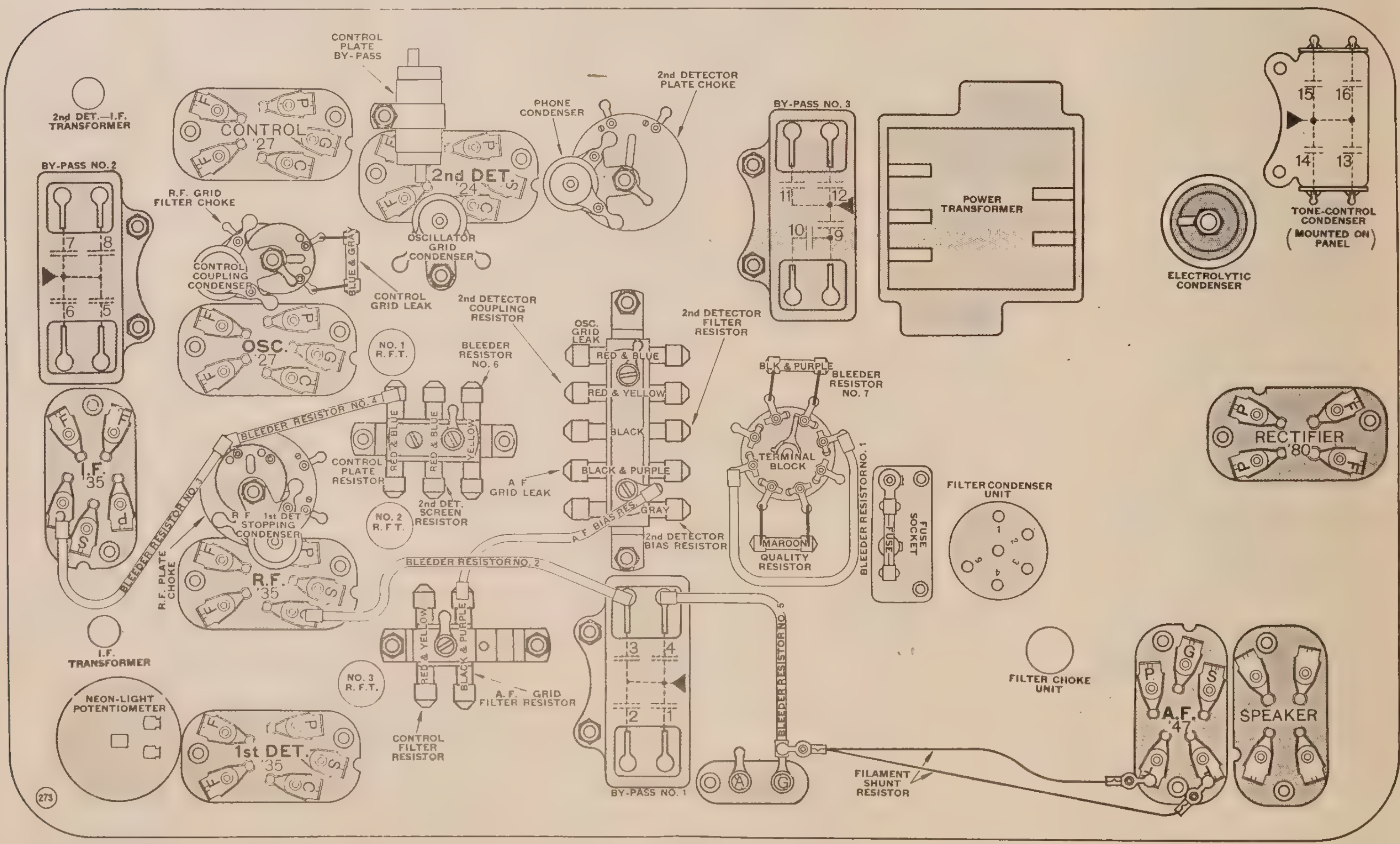
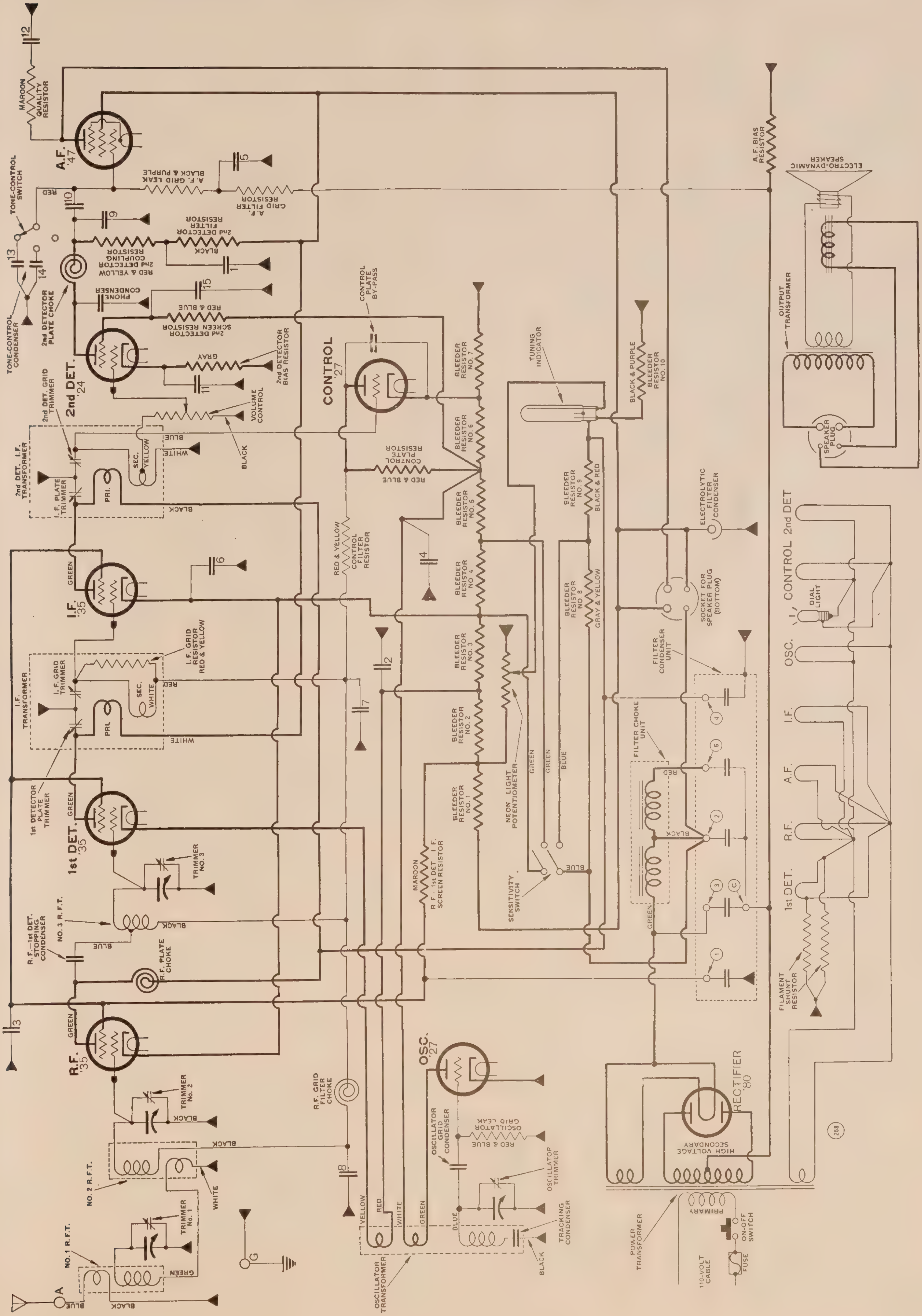

CONTROL PLATE BY-PASS
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
BY-PASS NO. 3
2nd DET.—I.F. TRANSFORMER
CONTROL '27
2nd DET. '24
POWER TRANSFORMER
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
ELECTROLYTIC CONDENSER
BY-PASS NO. 2
R.F. GRID FILTER CHOKE
TERMINAL BLOCK
OSC. TRANS.
OSCILLATOR GRID CONDENSER
BLEEDER RESISTOR NO. 6
2nd DETECTOR COUPLING RESISTOR
BLEEDER RESISTOR NO. 8
OSC. GRID LEAK
BLK & PURPLE
BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO. 2
OSC. '27
NO. 1 R.F.T.
R.F.—1st DET.—I.F. SCREEN RESISTOR
2nd DET. SCREEN RESISTOR
RED & BLUE
RED & YELLOW
BLACK
BLACK & PURPLE
GRAY
MAROON
GRAY & YEL
RECTIFIER '80
BLEEDER RES. NO. 5
BLEEDER RESISTOR NO 4
CONTROL PLATE RESISTOR
FILTER CONDENSER UNIT
FUSE SOCKET
I.F. '35
R.F. PLATE CHOKE
A. F. GRID LEAK
QUALITY RESISTOR
NO. 2 R.F.T.
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR BIAS RESISTOR
A. F. BIAS RESISTOR
R.F. -1st DET STOPPING CONDENSER
R.F. '35
CONTROL FILTER RESISTOR
BLEEDER RESISTOR NO. 7
BLK & RED
BLEEDER RESISTOR NO. 9
TERMINAL BLOCK
I.F. TRANSFORMER
NO. 3 R.F.T.
RED & YELLOW
BLACK & PURPLE
BY-PASS NO. 1
NEON LIGHT POTENTIOMETER
1st DET. '35
A. F. GRID FILTER RESISTOR
FILAMENT SHUNT RESISTOR
FILTER CHOKE UNIT
A.F. '47
SPEAKER
BLEEDER RESISTOR NO 1
BLEEDER RESISTOR NO. 3
A
G
269

CHART OF MODEL 96 (3rd Type) Above Serial No. 7291674


CONTROL PLATE BY-PASS
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
BY-PASS NO. 3
2nd DET.—I.F. TRANSFORMER
CONTROL '27
2nd DET. '24
POWER TRANSFORMER
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
ELECTROLYTIC CONDENSER
BY-PASS NO. 2
R.F. GRID FILTER CHOKE
OSCILLATOR GRID CONDENSER
CONTROL COUPLING CONDENSER
BLUE & GRAY
CONTROL GRID LEAK
2nd DETECTOR COUPLING RESISTOR
OSC. '27
NO. 1 R.F.T.
BLEEDER RESISTOR NO. 6
OSC. GRID LEAK
RED & BLUE
RED & YELLOW
BLACK
BLACK & PURPLE
GRAY
2nd DETECTOR FILTER RESISTOR
BLK & PURPLE
BLEEDER RESISTOR NO. 7
RECTIFIER '80
BLEEDER RESISTOR NO. 4
I.F. '35
CONTROL PLATE RESISTOR
YELLOW
MAROON
A F GRID LEAK
TERMINAL BLOCK
BLEEDER RESISTOR NO. 1
FILTER CONDENSER UNIT
FUSE SOCKET
BLEEDER RESISTOR NO. 3
R F 1st DET STOPPING CONDENSER
NO. 2 R.F.T.
2nd DET. SCREEN RESISTOR
A. F. BIAS RES.
2nd DETECTOR BIAS RESISTOR
QUALITY RESISTOR
R.F. PLATE CHOKE
R.F. '35
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 5
I.F. TRANSFORMER
NO. 3 R.F.T.
RED & YELLOW
BLACK & PURPLE
A.F. GRID FILTER RESISTOR
FILTER CHOKE UNIT
A.F. '47
SPEAKER
NEON-LIGHT POTENTIOMETER
1st DET. '35
CONTROL FILTER RESISTOR
BY-PASS NO. 1
A
G
FILAMENT SHUNT RESISTOR
273

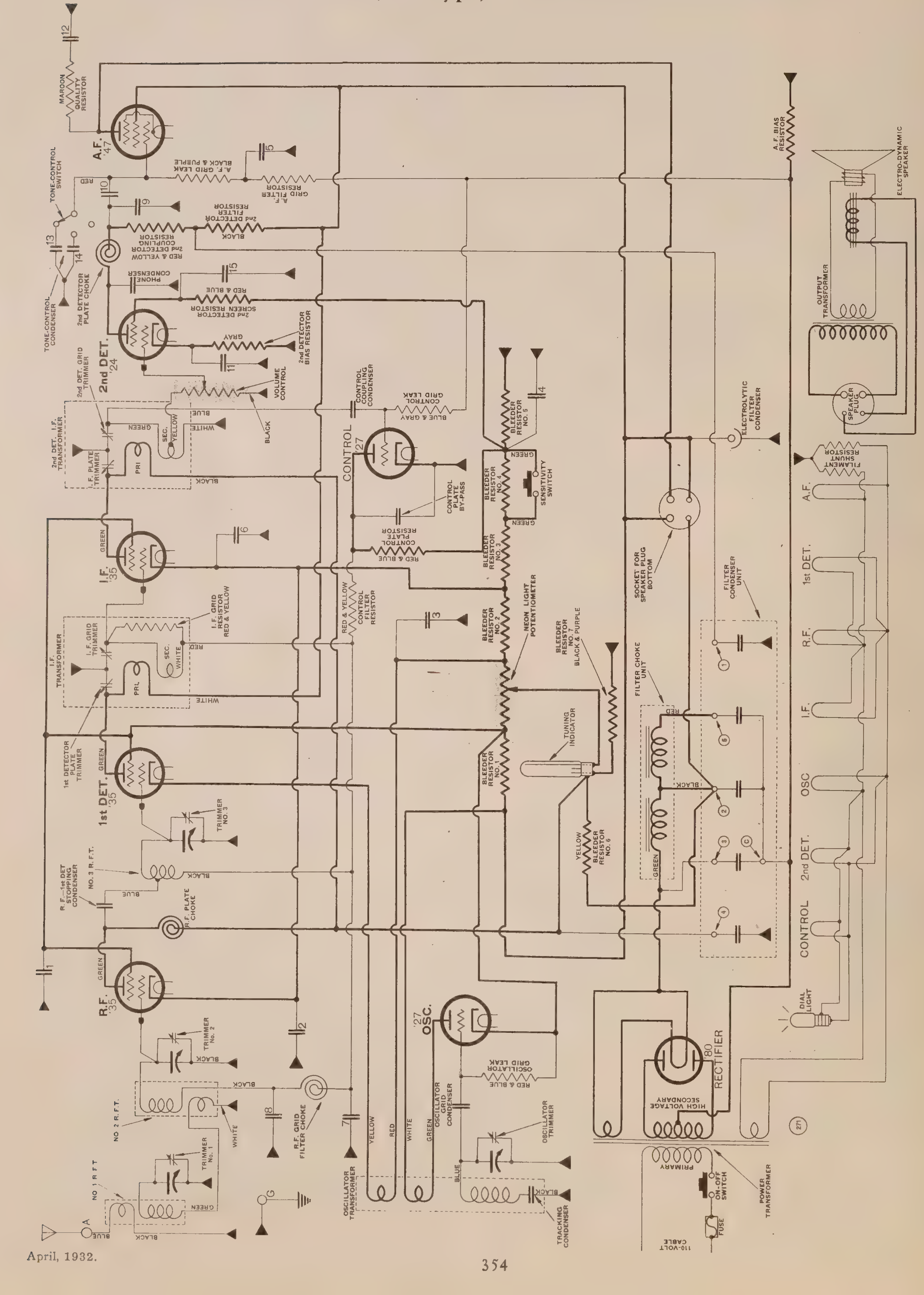
In some late type Model 96 receivers, a flexible type 1st-detector bias resistor (No. 16320) is connected between condenser 3 (in by-pass No. 1) and the lower contact of the potentiometer. In this case, bleeder No. 2 is connected from the lower contact of the potentiometer to the R. F. cathode. Also in some of these sets, a flexible bleeder No. 8 (No. 24450) is connected in series with the lead to the center contact of the potentiometer.

MODEL 96 (2nd Type) Serial Nos. 7289385 to 7291674


A.F. '47
MAROON QUALITY RESISTOR
12
TONE-CONTROL SWITCH
RED
A.F. GRID LEAK BLACK & PURPLE
A.F. GRID FILTER RESISTOR
5
10
9
2nd DETECTOR FILTER RESISTOR BLACK
2nd DETECTOR COUPLING RESISTOR RED & YELLOW
1
13
14
TONE-CONTROL CONDENSER
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
15
RED & BLUE 2nd DETECTOR SCREEN RESISTOR
2nd DET. '24
2nd DETECTOR BIAS RESISTOR
GRAY
11
VOLUME CONTROL
BLACK
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
I.F. PLATE TRIMMER
SEC. YELLOW
PRI.
BLUE
WHITE
CONTROL '27
CONTROL PLATE BY-PASS
CONTROL PLATE RESISTOR RED & BLUE
RED & YELLOW CONTROL FILTER RESISTOR
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 5
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
4
6
I.F. '35
GREEN
I.F. GRID RESISTOR RED & YELLOW
I.F. TRANSFORMER
I.F. GRID TRIMMER
SEC. WHITE
PRI.
RED
WHITE
2
7
1st DETECTOR PLATE TRIMMER
1st DET. '35
TRIMMER NO. 3
NO. 3 R.F.T.
R.F.—1st DET. STOPPING CONDENSER
R.F. PLATE CHOKE
3
R.F. '35
TRIMMER No. 2
NO. 2 R.F.T.
TRIMMER No. 1
NO. 1 R.F.T.
A
G
R.F. GRID FILTER CHOKE
8
MAROON R.F.-1st DET. I.F. SCREEN RESISTOR
OSC. '27
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR TRIMMER
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
YELLOW
RED
WHITE
GREEN
BLUE
BLACK
NEON LIGHT POTENTIOMETER
SENSITIVITY SWITCH
TUNING INDICATOR
BLACK & PURPLE BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO. 9 BLACK & RED
BLEEDER RESISTOR NO. 8 GRAY & YELLOW
ELECTROLYTIC FILTER CONDENSER
SOCKET FOR SPEAKER PLUG (BOTTOM)
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
1
2
3
4
5
C
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
110-VOLT CABLE
FUSE
ON-OFF SWITCH
A.F. BIAS RESISTOR
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
2nd DET
CONTROL
DIAL LIGHT
OSC.
I.F.
A.F.
R.F.
1st DET.
FILAMENT SHUNT RESISTOR
268

The neon-light potentiometer in 2nd type Model 96 does not have any identifying color.

MODEL 96 (3rd Type) Above Serial No. 7291674


A.F. '47
MAROON QUALITY RESISTOR
12
TONE-CONTROL SWITCH
RED
10
A.F. GRID LEAK BLACK & PURPLE
A.F. GRID FILTER RESISTOR
5
9
2nd DETECTOR FILTER RESISTOR BLACK
2nd DETECTOR COUPLING CONTROL RESISTOR RED & YELLOW
13
14
TONE-CONTROL CONDENSER
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
15
RED & BLUE
2nd DETECTOR SCREEN RESISTOR
2nd DET. '24
GRAY
2nd DETECTOR BIAS RESISTOR
11
VOLUME CONTROL
BLACK
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
I.F. PLATE TRIMMER
SEC.
PRI
YELLOW
GREEN
BLUE
WHITE
BLACK
CONTROL COUPLING CONDENSER
CONTROL GRID LEAK BLUE & GRAY
CONTROL '27
CONTROL PLATE BY-PASS
CONTROL PLATE RESISTOR RED & BLUE
BLEEDER RESISTOR NO. 5
4
BLEEDER RESISTOR NO. 4
SENSITIVITY SWITCH
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
NEON LIGHT POTENTIOMETER
BLEEDER RESISTOR NO. 1
BLEEDER RESISTOR NO. 7 BLACK & PURPLE
TUNING INDICATOR
YELLOW BLEEDER RESISTOR NO. 6
I.F. '35
6
I.F. GRID RESISTOR RED & YELLOW
RED & YELLOW CONTROL FILTER RESISTOR
3
I.F. TRANSFORMER
I.F. GRID TRIMMER
PRI.
SEC.
1st DETECTOR PLATE TRIMMER
1st DET. '35
TRIMMER NO. 3
NO. 3 R.F.T.
R.F.-1st DET STOPPING CONDENSER
R.F. PLATE CHOKE
R.F. '35
1
2
TRIMMER No. 2
NO 2 R.F.T.
8
R.F. GRID FILTER CHOKE
7
TRIMMER No. 1
NO 1 R F T
A
G
OSCILLATOR TRANSFORMER
YELLOW
RED
WHITE
GREEN
OSC. '27
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
TRACKING CONDENSER
A.F. BIAS RESISTOR
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
ELECTROLYTIC FILTER CONDENSER
SOCKET FOR SPEAKER PLUG BOTTOM
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
FILAMENT SHUNT RESISTOR
A.F.
1st DET.
R.F.
I.F.
OSC
2nd DET.
CONTROL
DIAL LIGHT
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
PRIMARY
ON-OFF SWITCH
FUSE
110-VOLT CABLE
POWER TRANSFORMER
271

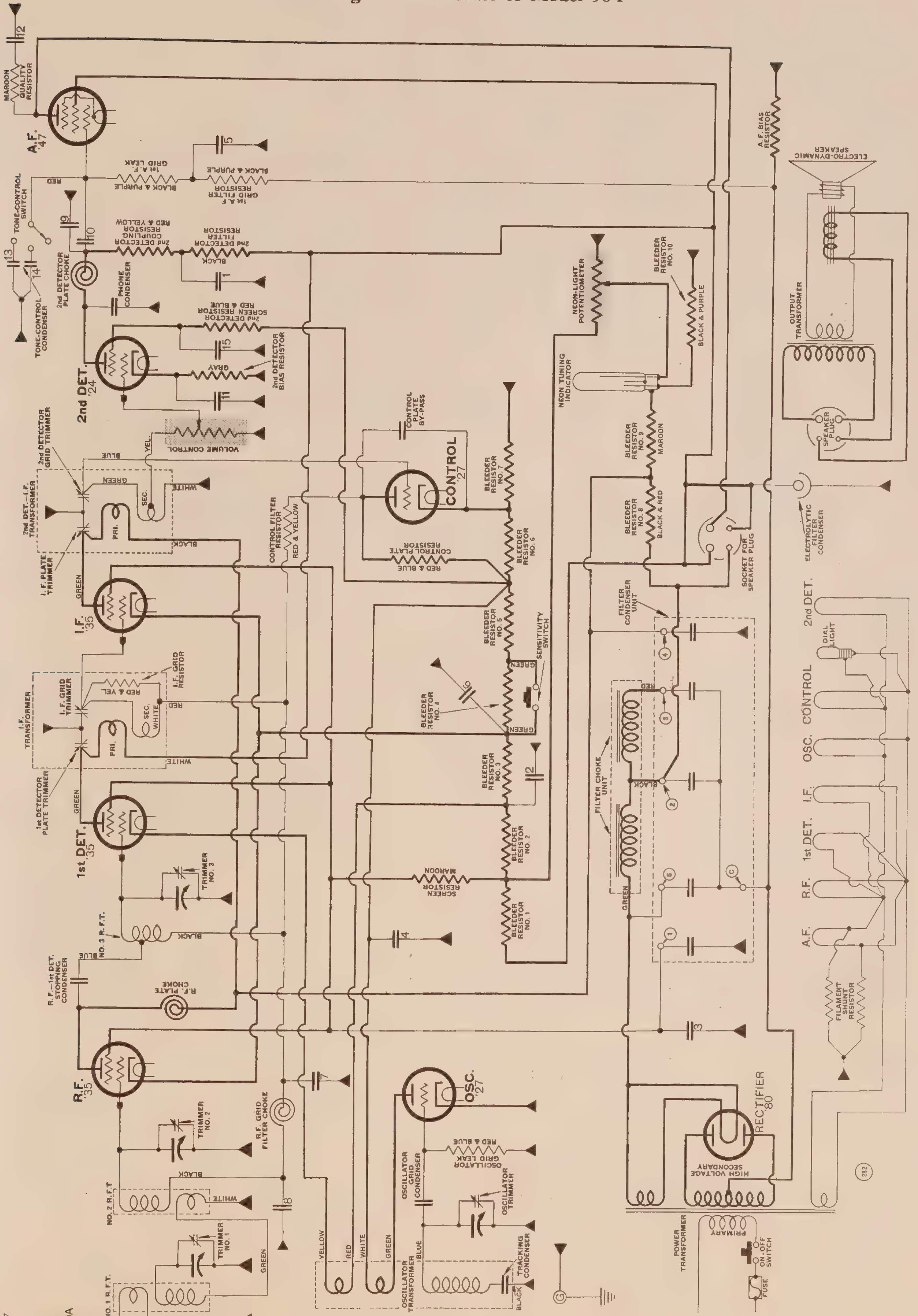
The neon-light potentiometer used in 3rd type Model 96 is marked with red paint as identification.

In some late type Model 96 receivers, a flexible type 1st-detector bias resistor (No. 16320) is connected in series with the red lead from the oscillator transformer, after by-pass 3. Also in some of these sets, a flexible bleeder No. 8 (No. 24450) is connected in series with the lead to the center contact of the potentiometer.

April, 1932.

MODEL 96-F

See Page 362 for Chart of Model 96-F


A.F. '47
MAROON QUALITY RESISTOR
12
1st A.F. GRID LEAK BLACK & PURPLE
1st A.F. GRID FILTER RESISTOR BLACK & PURPLE
5
TONE-CONTROL SWITCH
RED
9
10
13
14
TONE-CONTROL CONDENSER
2nd DETECTOR PLATE CHOKE
2nd DETECTOR COUPLING RESISTOR RED & YELLOW
2nd DETECTOR FILTER RESISTOR BLACK
1
PHONE CONDENSER
2nd DETECTOR SCREEN RESISTOR RED & BLUE
15
GRAY
2nd DETECTOR BIAS RESISTOR
11
2nd DET. '24
VOLUME CONTROL
YEL.
BLUE
2nd DETECTOR GRID TRIMMER
GREEN
WHITE
SEC.
PRI.
BLACK
2nd DET.—I.F. TRANSFORMER
I.F. PLATE TRIMMER
CONTROL PLATE BY-PASS
CONTROL '27
CONTROL FILTER RESISTOR RED & YELLOW
CONTROL PLATE RESISTOR RED & BLUE
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 5
I.F. '35
I.F. GRID TRIMMER
I.F. GRID RESISTOR
RED & YEL.
RED
I.F. TRANSFORMER
1st DETECTOR PLATE TRIMMER
1st DET. '35
SENSITIVITY SWITCH
16
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 3
2
BLEEDER RESISTOR NO. 2
SCREEN RESISTOR MAROON
BLEEDER RESISTOR NO. 1
TRIMMER NO. 3
NO. 3 R.F.T.
R.F.—1st DET. STOPPING CONDENSER
R.F. PLATE CHOKE
4
R.F. '35
TRIMMER NO. 2
R.F. GRID FILTER CHOKE
7
8
NO. 2 R.F.T.
TRIMMER NO. 1
NO. 1 R.F.T.
A
OSC. '27
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
YELLOW
RED
WHITE
GREEN
BLUE
G
NEON-LIGHT POTENTIOMETER
NEON TUNING INDICATOR
BLEEDER RESISTOR NO. 10 BLACK & PURPLE
BLEEDER RESISTOR NO. 9 MAROON
BLEEDER RESISTOR NO. 8 BLACK & RED
A.F. BIAS RESISTOR
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
SOCKET FOR SPEAKER PLUG
ELECTROLYTIC FILTER CONDENSER
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
1
2
3
4
5
6
3
2nd DET.
DIAL LIGHT
CONTROL
OSC.
I.F.
1st DET.
R.F.
A.F.
FILAMENT SHUNT RESISTOR
RECTIFIER '80
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
282

MODEL 99, 99-F, 99-P TOP VIEW

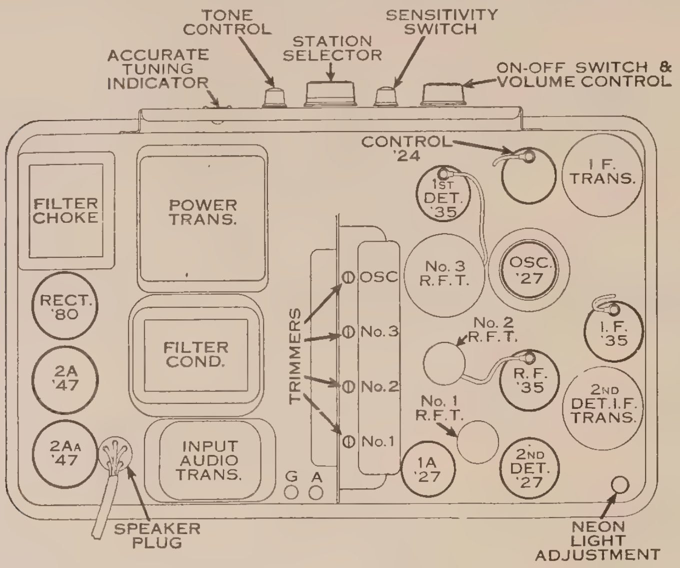
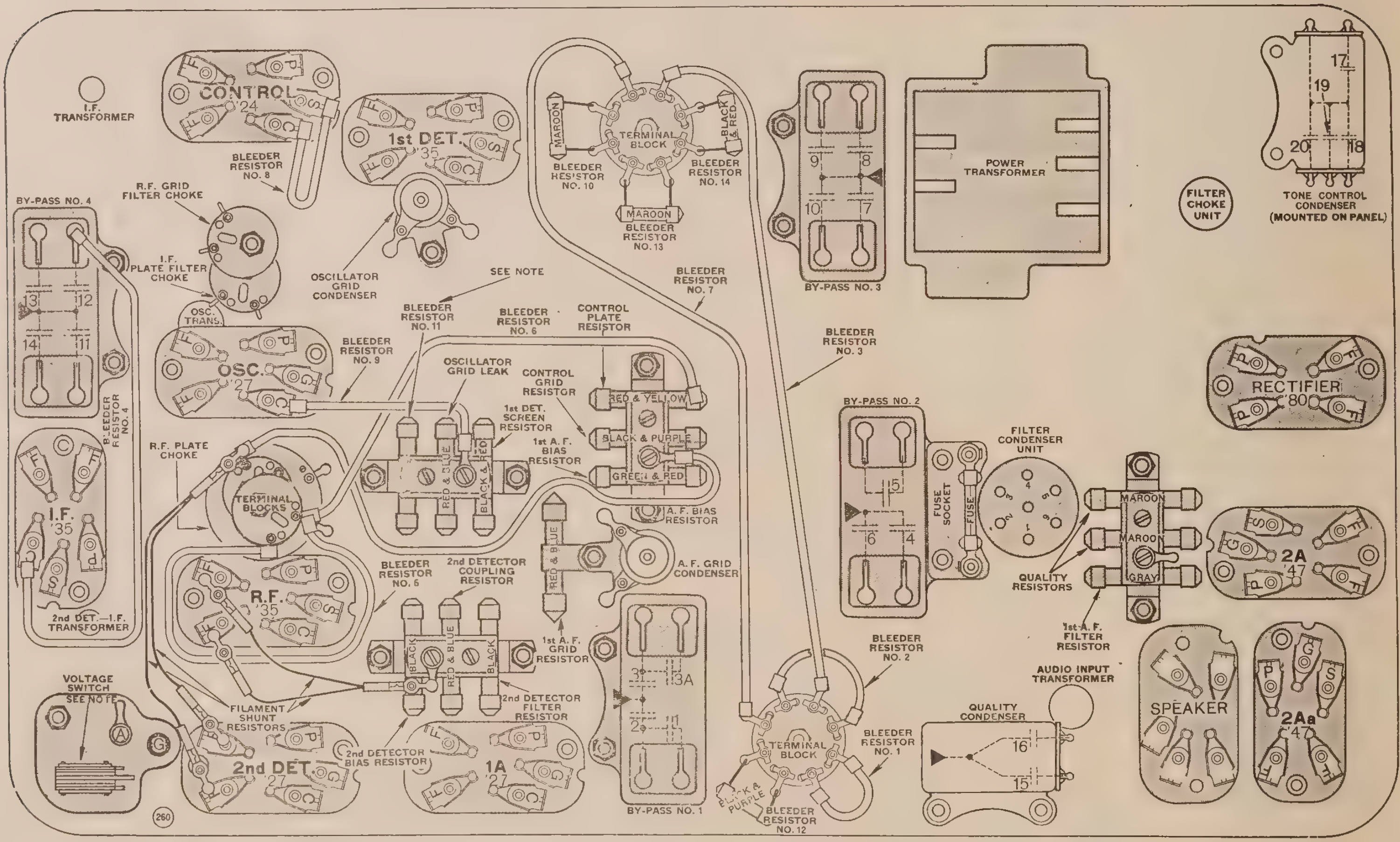

TONE CONTROL
STATION SELECTOR
SENSITIVITY SWITCH
ACCURATE TUNING INDICATOR
ON-OFF SWITCH & VOLUME CONTROL
CONTROL '24
I F. TRANS.
1ST DET. '35
FILTER CHOKE
POWER TRANS.
No. 3 R.F.T.
OSC. '27
RECT. '80
FILTER COND.
TRIMMERS
OSC
No.3
No.2
No.1
No. 2 R.F.T.
I. F. '35
2A '47
R.F. '35
2ND DET.I.F. TRANS.
No. 1 R.F.T.
2AA '47
INPUT AUDIO TRANS.
G
A
1A '27
2ND DET. '27
SPEAKER PLUG
NEON LIGHT ADJUSTMENT

CHART OF MODEL 99 (1st Type) Below Serial No. 4882380


I.F. TRANSFORMER
CONTROL '24
F
P
S
C
1st DET. '35
BLEEDER RESISTOR NO. 8
MAROON
TERMINAL BLOCK
BLACK & RED
BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO. 14
MAROON
BLEEDER RESISTOR NO. 13
9
8
10
7
BY-PASS NO. 3
POWER TRANSFORMER
17
19
20
18
FILTER CHOKE UNIT
TONE CONTROL CONDENSER (MOUNTED ON PANEL)
BY-PASS NO. 4
R.F. GRID FILTER CHOKE
I.F. PLATE FILTER CHOKE
OSCILLATOR GRID CONDENSER
SEE NOTE
BLEEDER RESISTOR NO. 7
13
12
14
11
OSC. TRANS.
BLEEDER RESISTOR NO. 11
BLEEDER RESISTOR NO. 6
CONTROL PLATE RESISTOR
BLEEDER RESISTOR NO. 3
OSC. '27
G
BLEEDER RESISTOR NO. 9
OSCILLATOR GRID LEAK
CONTROL GRID RESISTOR
RED & YELLOW
1st DET. SCREEN RESISTOR
BLACK & PURPLE
1st A. F. BIAS RESISTOR
GREEN & RED
RECTIFIER '80
BLEEDER RESISTOR NO. 4
R.F. PLATE CHOKE
TERMINAL BLOCKS
RED & BLUE
BLACK & RED
A. F. BIAS RESISTOR
BY-PASS NO. 2
5
6
4
FUSE SOCKET
FUSE
FILTER CONDENSER UNIT
MAROON
MAROON
GRAY
QUALITY RESISTORS
2A '47
I.F. '35
BLEEDER RESISTOR NO. 5
2nd DETECTOR COUPLING RESISTOR
RED & BLUE
A. F. GRID CONDENSER
R.F. '35
BLACK
RED & BLUE
BLACK
1st A. F. GRID RESISTOR
1st A. F. FILTER RESISTOR
2nd DET.—I.F. TRANSFORMER
3
3A
2
1
BLEEDER RESISTOR NO. 2
AUDIO INPUT TRANSFORMER
VOLTAGE SWITCH SEE NOTE
A
FILAMENT SHUNT RESISTORS
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR BIAS RESISTOR
TERMINAL BLOCK
BLEEDER RESISTOR NO. 1
QUALITY CONDENSER
16
15
SPEAKER
2Aa '47
2nd DET. '27
1A '27
BY-PASS NO. 1
BLACK & PURPLE
BLEEDER RESISTOR NO. 12
260

Bleeder Resistor No. 11 is Yellow.

By-pass No. 1

1—2nd-detector — A. F. coupling condenser.
2—Phone condenser.
3—2nd-detector bias by-pass.
3A—Not used.

By-pass No. 2

4—2nd-detector plate filter condenser.
5—Screen by-pass.
6—R. F. bias by-pass.

By-pass No. 3

7—R. F. plate filter condenser.
8—Control plate filter condenser.
9—1st-detector screen by-pass.
10—Control cathode by-pass.

By-pass No. 4

11—R. F. grid filter condenser.
12—1st-detector bias by-pass.
13—Control plate by-pass.
14—I. F. plate filter condenser.

Quality Condenser

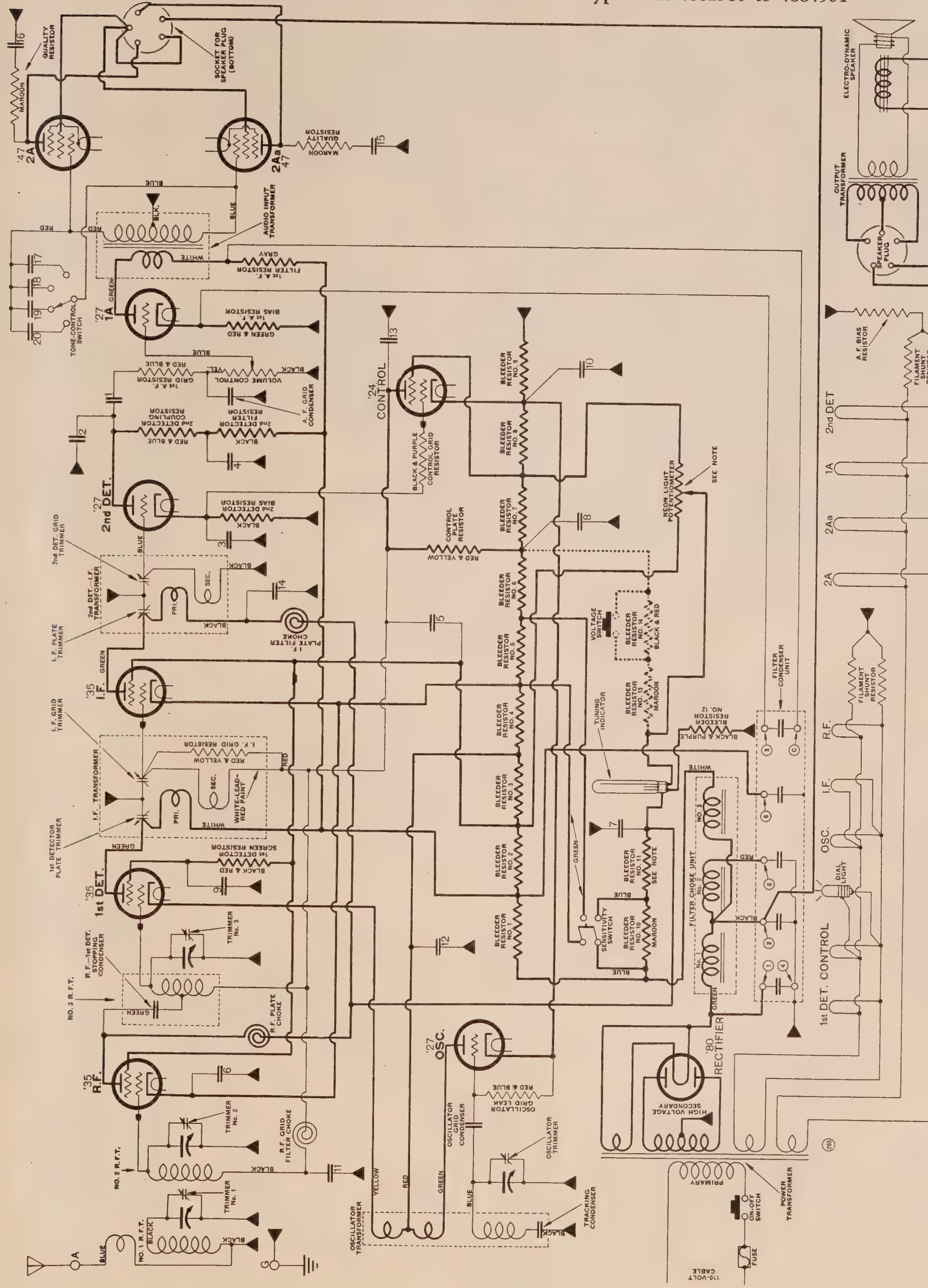
15—Quality condenser.
16—Quality condenser.

Tone-control Condenser (on panel)

17—Tone condenser.
18—Tone condenser.
19—Tone condenser.
20—Tone condenser.

MODEL 99 (1st and 2nd Types)

1st Type Below Serial No. 4882380 2nd Type from 4882380 to 4884901


QUALITY RESISTOR
MAROON
16
SOCKET FOR SPEAKER PLUG (BOTTOM)
'47 2A
2Aa '47
QUALITY RESISTOR
MAROON
15
BLUE
RED
BLK.
AUDIO INPUT TRANSFORMER
WHITE
1st A.F. FILTER RESISTOR
GRAY
17
18
19
20
TONE-CONTROL SWITCH
GREEN
'27 1A
1st A.F. BIAS RESISTOR
GREEN & RED
1st A.F. GRID RESISTOR
RED & BLUE
VOLUME CONTROL
YEL
BLACK
A.F. GRID CONDENSER
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
1
2
4
'27 2nd DET.
2nd DETECTOR BIAS RESISTOR
3
2nd DET. GRID TRIMMER
2nd DET.—I.F. TRANSFORMER
SEC.
PRI.
14
I.F. PLATE FILTER CHOKE
I.F. PLATE TRIMMER
'35 I.F.
I.F. GRID TRIMMER
I.F. GRID RESISTOR
RED & YELLOW
I.F. TRANSFORMER
WHITE-LEAD RED PAINT
1st DETECTOR PLATE TRIMMER
'35 1st DET.
1st DETECTOR SCREEN RESISTOR
BLACK & RED
9
TRIMMER No. 3
R.F.—1st DET. STOPPING CONDENSER
NO. 3 R.F.T.
R.F. PLATE CHOKE
'35 R.F.
6
TRIMMER No. 2
NO. 2 R.F.T.
R.F. GRID FILTER CHOKE
11
TRIMMER No. 1
NO. 1 R.F.T.
A
G
'24 CONTROL
13
BLACK & PURPLE CONTROL GRID RESISTOR
CONTROL PLATE RESISTOR
RED & YELLOW
5
12
BLEEDER RESISTOR NO. 9
BLEEDER RESISTOR NO. 8
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 5
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
10
8
NEON LIGHT POTENTIOMETER
SEE NOTE
VOLTAGE SWITCH
BLEEDER RESISTOR NO. 14
BLACK & RED
BLEEDER RESISTOR NO. 13
MAROON
TUNING INDICATOR
BLEEDER RESISTOR NO. 12
BLACK & PURPLE
FILTER CONDENSER UNIT
7
GREEN
BLEEDER RESISTOR NO. 11
SEE NOTE
SENSITIVITY SWITCH
BLEEDER RESISTOR NO. 10
MAROON
FILTER CHOKE UNIT
No. 1
No. 2
No. 3
'27 OSC.
OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
YELLOW
RED
GREEN
BLUE
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
A.F. BIAS RESISTOR
FILAMENT SHUNT RESISTOR
2nd DET
1A
2Aa
2A
R.F.
I.F.
OSC.
DIAL LIGHT
1st DET. CONTROL

NOTE—In 1st type sets, the neon-light potentiometer is not used, and the circuit is connected as shown in dotted lines. In early sets using the voltage switch, bleeder No. 11 is yellow. In sets using the potentiometer, bleeder No. 11 is yellow-and-gray. In a few sets using the potentiometer, bleeder No. 11 consists of two gray resistors in parallel. The neon-light potentiometer in 2nd type Model 99 does not have any identifying color.

CHART OF MODEL 99 (2nd Type) Serial Nos. 4882380 to 4884901

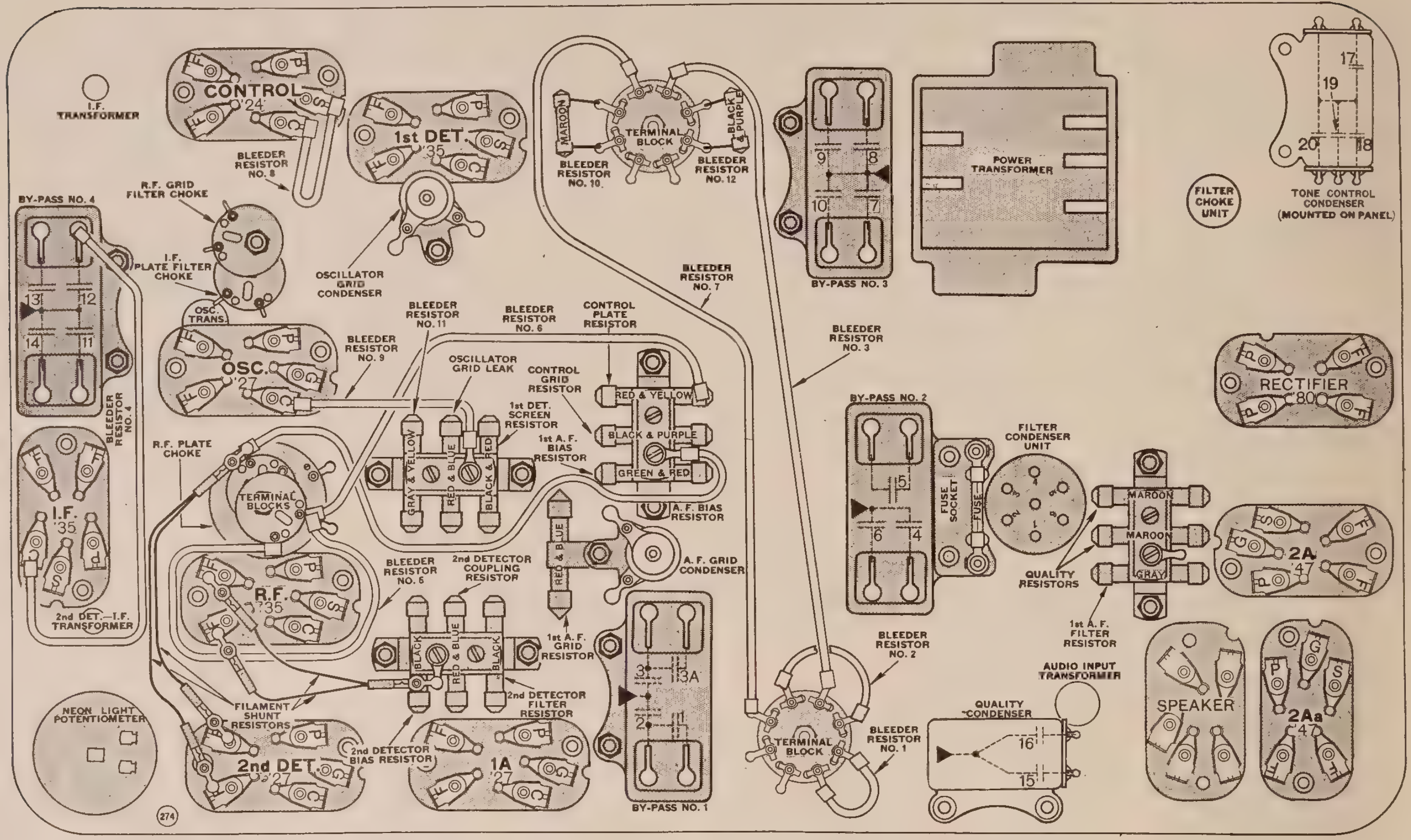
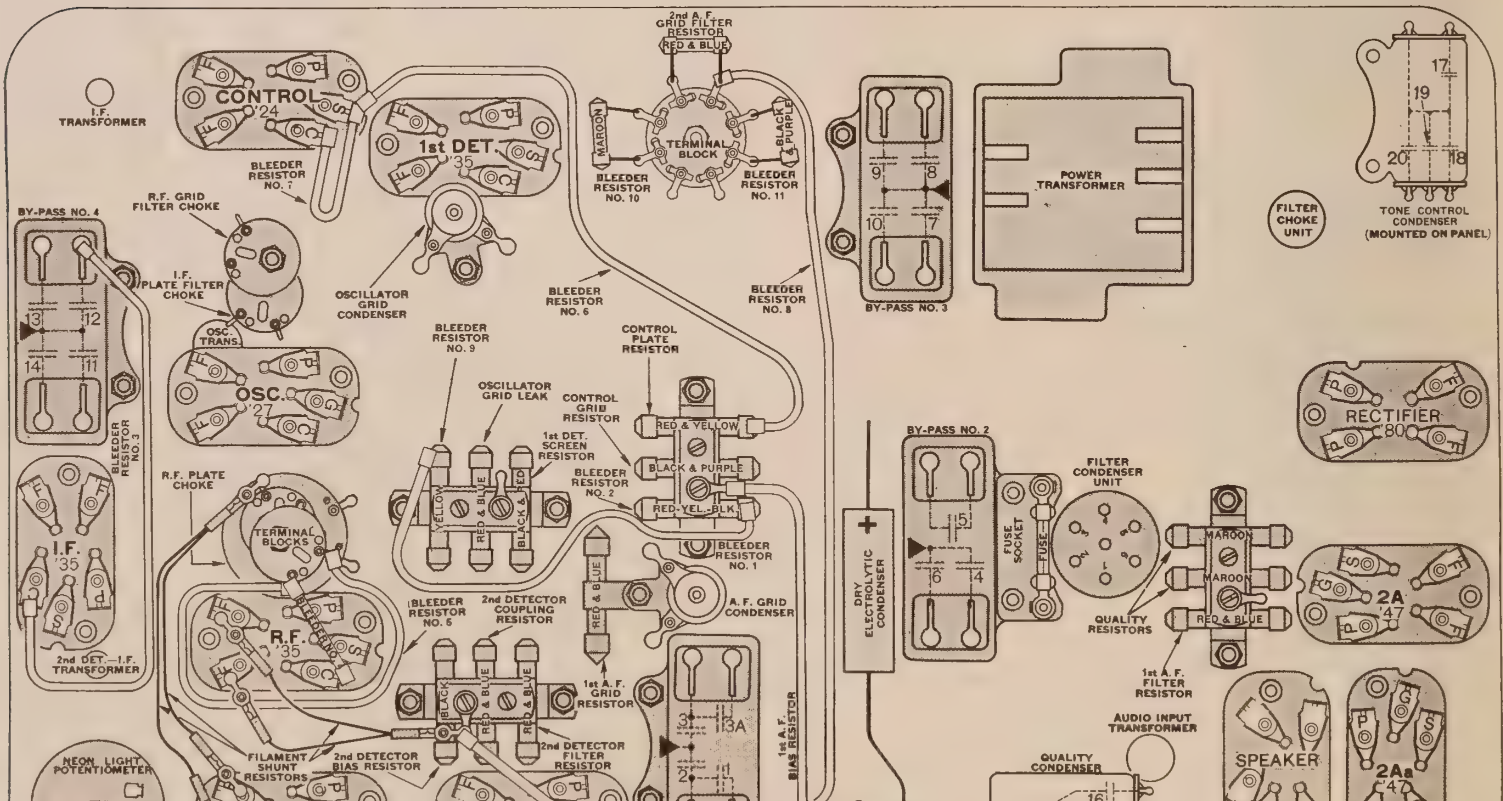
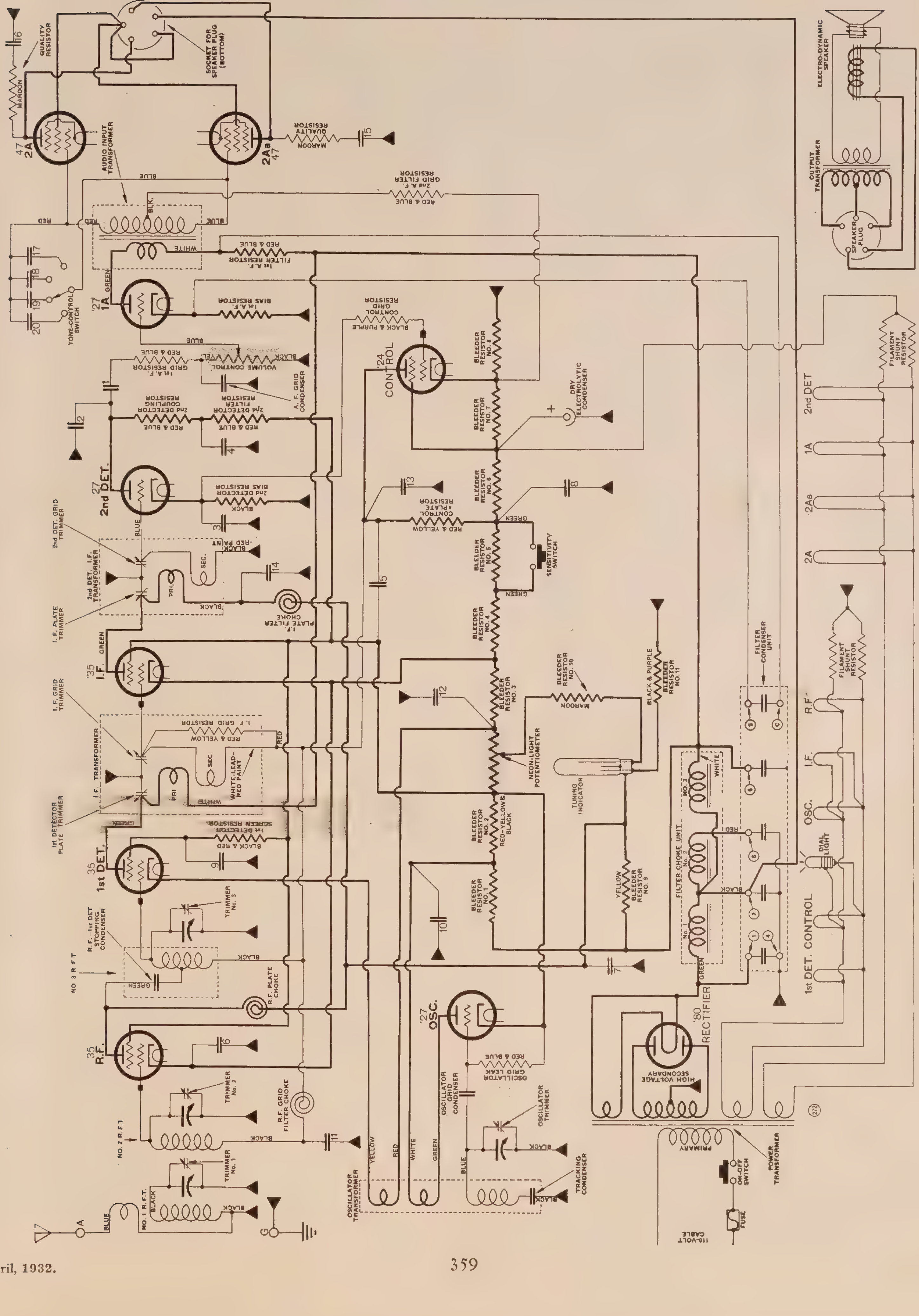

I.F. TRANSFORMER
CONTROL '24
BLEEDER RESISTOR NO. 8
1st DET. '35
MAROON
TERMINAL BLOCK
BLACK & PURPLE
BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO. 12
POWER TRANSFORMER
BY-PASS NO. 3
17
19
20
18
TONE CONTROL CONDENSER (MOUNTED ON PANEL)
FILTER CHOKE UNIT
BY-PASS NO. 4
R.F. GRID FILTER CHOKE
I.F. PLATE FILTER CHOKE
OSCILLATOR GRID CONDENSER
OSC. TRANS.
OSC. '27
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 9
BLEEDER RESISTOR NO. 11
BLEEDER RESISTOR NO. 6
CONTROL PLATE RESISTOR
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 3
OSCILLATOR GRID LEAK
CONTROL GRID RESISTOR
1st DET. SCREEN RESISTOR
1st A.F. BIAS RESISTOR
RED & YELLOW
BLACK & PURPLE
GREEN & RED
GRAY & YELLOW
RED & BLUE
BLACK & RED
A.F. BIAS RESISTOR
RECTIFIER '80
BY-PASS NO. 2
FILTER CONDENSER UNIT
FUSE SOCKET
FUSE
MAROON
MAROON
GRAY
QUALITY RESISTORS
2A '47
R.F. PLATE CHOKE
TERMINAL BLOCKS
I.F. '35
R.F. '35
2nd DET.—I.F. TRANSFORMER
BLEEDER RESISTOR NO. 5
2nd DETECTOR COUPLING RESISTOR
RED & BLUE
A.F. GRID CONDENSER
1st A.F. GRID RESISTOR
BLACK
RED & BLUE
BLACK
2nd DETECTOR FILTER RESISTOR
1st A.F. FILTER RESISTOR
BLEEDER RESISTOR NO. 2
AUDIO INPUT TRANSFORMER
FILAMENT SHUNT RESISTORS
NEON LIGHT POTENTIOMETER
2nd DETECTOR BIAS RESISTOR
2nd DET. '27
1A '27
13A
3
2
BY-PASS NO. 1
TERMINAL BLOCK
BLEEDER RESISTOR NO. 1
QUALITY CONDENSER
16
15
SPEAKER
2Aa '47
274

CHART OF MODEL 99 (3rd Type) Above Serial No. 4884901
MODELS 99-F AND 99-P


2nd A.F. GRID FILTER RESISTOR
RED & BLUE
I.F. TRANSFORMER
CONTROL '24
BLEEDER RESISTOR NO. 7
1st DET. '35
MAROON
TERMINAL BLOCK
BLACK & PURPLE
BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO. 11
POWER TRANSFORMER
BY-PASS NO. 3
17
19
20
18
TONE CONTROL CONDENSER (MOUNTED ON PANEL)
FILTER CHOKE UNIT
BY-PASS NO. 4
R.F. GRID FILTER CHOKE
I.F. PLATE FILTER CHOKE
OSCILLATOR GRID CONDENSER
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 8
OSC. TRANS.
OSC. '27
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 9
CONTROL PLATE RESISTOR
OSCILLATOR GRID LEAK
CONTROL GRID RESISTOR
1st DET. SCREEN RESISTOR
BLEEDER RESISTOR NO. 2
RED & YELLOW
BLACK & PURPLE
RED-YEL.-BLK.
YELLOW
RED & BLUE
BLACK & RED
BLEEDER RESISTOR NO. 1
RECTIFIER '80
BY-PASS NO. 2
FILTER CONDENSER UNIT
DRY ELECTROLYTIC CONDENSER
FUSE SOCKET
FUSE
MAROON
MAROON
RED & BLUE
QUALITY RESISTORS
2A '47
R.F. PLATE CHOKE
TERMINAL BLOCKS
I.F. '35
R.F. '35
2nd DET.—I.F. TRANSFORMER
BLEEDER RESISTOR NO. 5
2nd DETECTOR COUPLING RESISTOR
RED & BLUE
A.F. GRID CONDENSER
1st A.F. GRID RESISTOR
BLACK
RED & BLUE
RED & BLUE
2nd DETECTOR FILTER RESISTOR
1st A.F. BIAS RESISTOR
1st A.F. FILTER RESISTOR
AUDIO INPUT TRANSFORMER
FILAMENT SHUNT RESISTORS
2nd DETECTOR BIAS RESISTOR
NEON LIGHT POTENTIOMETER
2nd DET. '27
1A '27
13A
3
2
BY-PASS NO. 1
A
G
QUALITY CONDENSER
16
15
SPEAKER
2Aa '47
289

See Page 360 for Circuit of Model 99-F and 99-P.

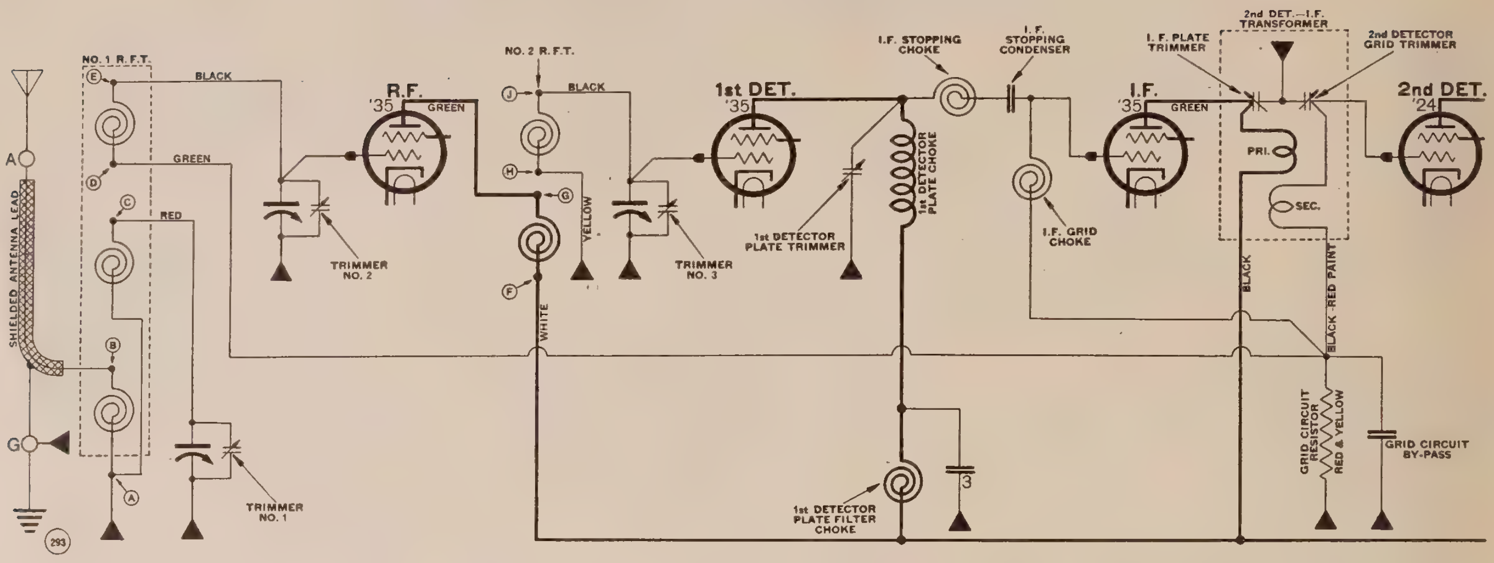
MODEL 99 (3rd Type) Above Serial No. 4884901


QUALITY RESISTOR
MAROON
16
SOCKET FOR SPEAKER PLUG (BOTTOM)
47 2A
2Aa 47
MAROON QUALITY RESISTOR
15
AUDIO INPUT TRANSFORMER
BLUE
BLK.
RED
2nd A.F. GRID FILTER RESISTOR RED & BLUE
1st A.F. FILTER RESISTOR RED & BLUE
WHITE
GREEN
'27 1A
1st A.F. BIAS RESISTOR
17
18
19
20
TONE-CONTROL SWITCH
CONTROL GRID RESISTOR BLACK & PURPLE
'24 CONTROL
1st A.F. GRID RESISTOR RED & BLUE
VOLUME CONTROL
YEL.
BLACK
A.F. GRID CONDENSER
1
2
2nd DETECTOR COUPLING RESISTOR RED & BLUE
2nd DETECTOR FILTER RESISTOR RED & BLUE
4
'27 2nd DET.
2nd DETECTOR BIAS RESISTOR BLACK
3
13
+PLATE CONTROL RESISTOR RED & YELLOW
8
GREEN
SENSITIVITY SWITCH
BLEEDER RESISTOR No. 8
BLEEDER RESISTOR No. 7
BLEEDER RESISTOR No. 6
BLEEDER RESISTOR No. 5
BLEEDER RESISTOR No. 4
BLEEDER RESISTOR No. 3
BLEEDER RESISTOR No. 2
BLEEDER RESISTOR No. 1
RED-YELLOW & BLACK
DRY ELECTROLYTIC CONDENSER
2nd DET. GRID TRIMMER
2nd DET. I.F. TRANSFORMER
SEC.
PRI.
BLACK-RED PAINT
BLACK
14
I.F. PLATE FILTER CHOKE
5
I.F. PLATE TRIMMER
'35 I.F.
12
BLEEDER RESISTOR No. 10 MAROON
BLACK & PURPLE BLEEDER RESISTOR No. 11
NEON-LIGHT POTENTIOMETER
TUNING INDICATOR
I.F. GRID TRIMMER
I.F. GRID RESISTOR RED & YELLOW
RED
I.F. TRANSFORMER
WHITE-LEAD-RED PAINT
WHITE
1st DETECTOR PLATE TRIMMER
1st DETECTOR SCREEN RESISTOR BLACK & RED
'35 1st DET.
9
YELLOW BLEEDER RESISTOR No. 9
TRIMMER No. 3
R.F.-1st DET STOPPING CONDENSER
NO 3 R F T
10
7
R.F. PLATE CHOKE
'27 OSC.
'35 R.F.
6
OSCILLATOR GRID LEAK RED & BLUE
OSCILLATOR GRID CONDENSER
TRIMMER No. 2
R.F. GRID FILTER CHOKE
NO. 2 R.F.T.
11
OSCILLATOR TRIMMER
TRIMMER No. 1
No. 1 R.F.T.
BLUE
A
G
YELLOW
RED
WHITE
GREEN
OSCILLATOR TRANSFORMER
TRACKING CONDENSER
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
FILAMENT SHUNT RESISTOR
2nd DET
1A
2Aa
2A
FILTER CONDENSER UNIT
FILTER CHOKE UNIT
No. 3
No. 2
No. 1
'80 RECTIFIER
HIGH VOLTAGE SECONDARY
DIAL LIGHT
R.F.
I.F.
OSC.
1st DET. CONTROL
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE
272

The neon-light potentiometer in 3rd type Model 99 is marked with green paint as identification.

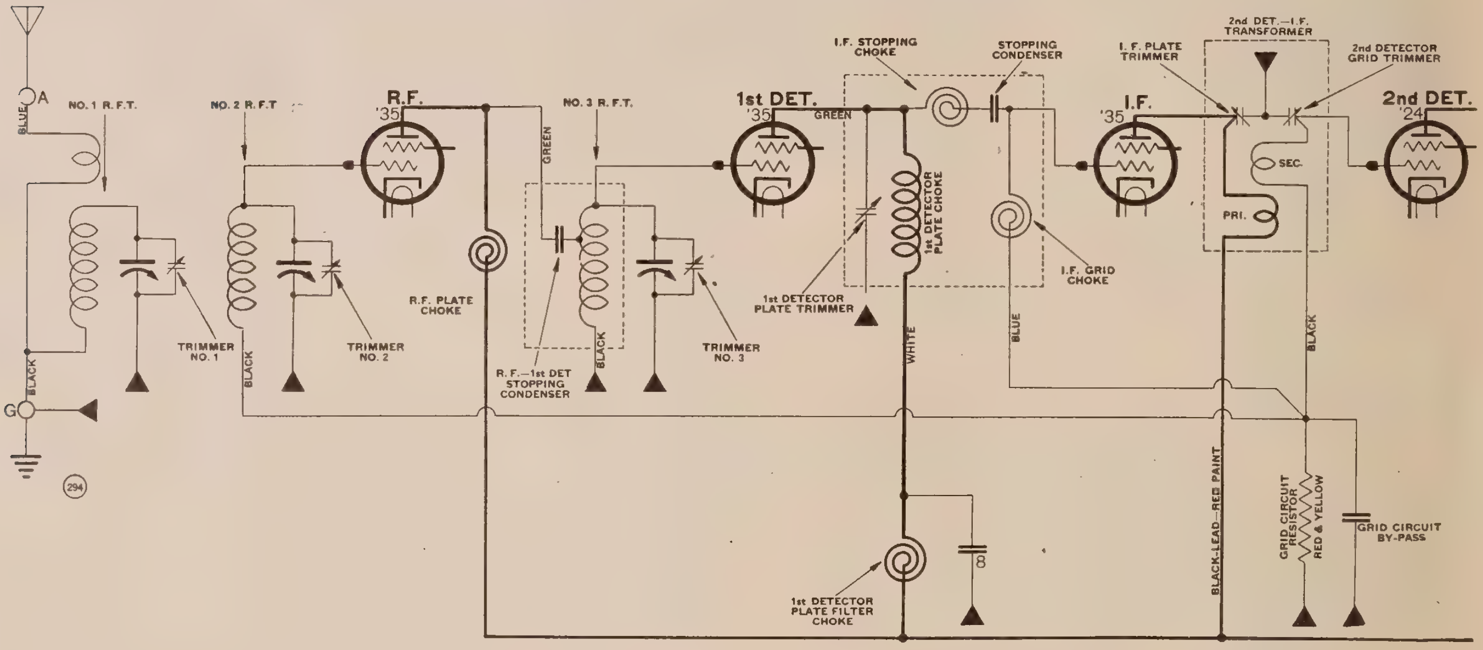
April, 1932.

CHANGE IN LATE TYPE MODEL 90


NO. 1 R.F.T.
BLACK
GREEN
RED
E
D
C
B
A
A
G
SHIELDED ANTENNA LEAD
TRIMMER NO. 1
R.F.
'35
GREEN
TRIMMER NO. 2
NO. 2 R.F.T.
J
H
G
F
BLACK
YELLOW
WHITE
TRIMMER NO. 3
1st DET.
'35
1st DETECTOR PLATE TRIMMER
I.F. STOPPING CHOKE
I.F. STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
I.F. GRID CHOKE
1st DETECTOR PLATE FILTER CHOKE
3
I.F.
'35
GREEN
I.F. PLATE TRIMMER
2nd DET.—I.F. TRANSFORMER
2nd DETECTOR GRID TRIMMER
PRI.
SEC.
BLACK
RED PAINT
BLACK
GRID CIRCUIT RESISTOR
RED & YELLOW
GRID CIRCUIT BY-PASS
2nd DET.
'24
293

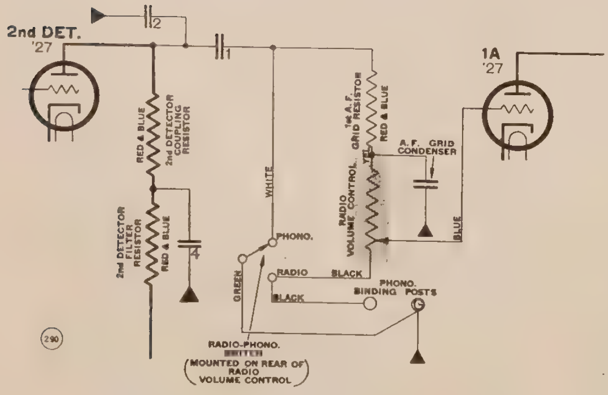
In late type Model 90, the grid returns of the R. F., I. F., and 2nd-detector tubes are connected to ground through a red-and-yellow resistor as shown above.

CHANGE IN LATE TYPE MODEL 94


A
BLUE
NO. 1 R.F.T.
BLACK
G
TRIMMER NO. 1
NO. 2 R.F.T
BLACK
TRIMMER NO. 2
R.F.
'35
R.F. PLATE CHOKE
NO. 3 R.F.T.
GREEN
BLACK
R.F.—1st DET STOPPING CONDENSER
TRIMMER NO. 3
1st DET.
'35
GREEN
I.F. STOPPING CHOKE
STOPPING CONDENSER
1st DETECTOR PLATE CHOKE
1st DETECTOR PLATE TRIMMER
WHITE
1st DETECTOR PLATE FILTER CHOKE
8
I.F. GRID CHOKE
BLUE
I.F.
'35
I.F. PLATE TRIMMER
2nd DET.—I.F. TRANSFORMER
2nd DETECTOR GRID TRIMMER
SEC.
PRI.
BLACK
BLACK-LEAD—RED PAINT
GRID CIRCUIT RESISTOR
RED & YELLOW
GRID CIRCUIT BY-PASS
2nd DET.
'24
294

In late type Model 94, the grid returns of the R. F., I. F., and 2nd-detector tubes are connected to ground through a red-and-yellow resistor as shown above.

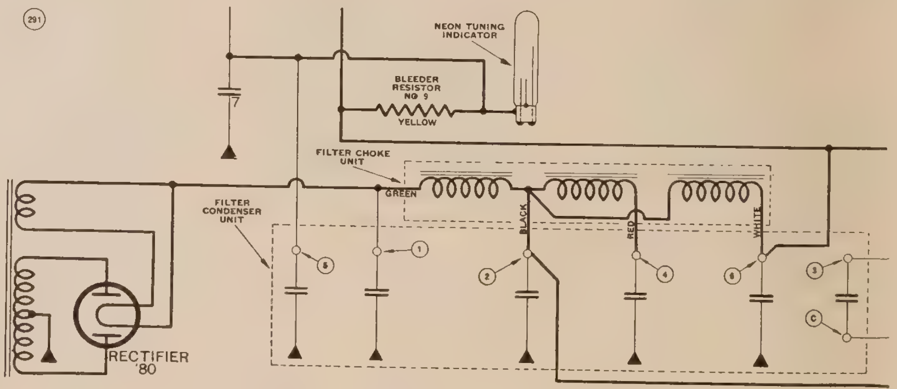
MODEL 99-P


2nd DET.
'27
2
1
RED & BLUE
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
RED & BLUE
4
WHITE
PHONO.
RADIO
BLACK
BLACK
GREEN
RADIO-PHONO. SWITCH
(MOUNTED ON REAR OF RADIO VOLUME CONTROL)
1st A.F. GRID RESISTOR
RED & BLUE
YEL
RADIO VOLUME CONTROL
A.F. GRID CONDENSER
PHONO. BINDING POSTS
G
BLUE
1A
'27
290

Phonograph Switching Circuit

The rest of the circuit is the same as the 3rd type Model 99, except that there is no sensitivity switch and bleeder No. 5 is omitted.

MODEL 99-F


291
7
NEON TUNING INDICATOR
BLEEDER RESISTOR NO 9
YELLOW
FILTER CHOKE UNIT
GREEN
FILTER CONDENSER UNIT
BLACK
RED
WHITE
5
1
2
4
6
3
C
RECTIFIER
'80

Filter Circuit of Model 99-F

The rest of the circuit is the same as the 3rd type Model 99.

TUBULAR RESISTORS

(Large Size, 1¾ inches long)

Part No.	*Identifying Color	List Price
15285	Gray	$ .50
15544	Yellow	.25
15545	Maroon	.25
15592	Black	.25
15891	Black-red	.25
15892	Green	.25
16282	Blue-red	.25
16724	White	.25
19346	Green-red	.30
19581	Red-yellow	.25
19649	Black-purple	.25
20151	Purple	.25
20223	Red-gray	.25
21784	Gray-green (Superseded by 22211)	.25
22211	Yellow-gray	.25
22407	Black-yellow-red	.25

(Small Size, 1 inch long)

Part No.	*Identifying Color	List Price
20920	Red-yellow	$ .25
20930	Black-purple	.25
20940	Green	.25
20950	Maroon	.25
20960	Gray-yellow	.25
20970	Gray	.25
20980	Red-blue	.25
21040	Black	.25
21050	Blue-gray	.25
23120	Red-black	.25
23130	Red-gray	.25
26160	White	.25

* When replacing a tubular resistor, use a resistor of the same identifying color and size. The background color of the resistor is disregarded in the identification except in the case of the all-white or all-black resistors. If a resistor has black-and-red coloring on a white base, the identification is black and red, not black, white and red.

BY-PASS AND TONE-CONTROL CONDENSERS

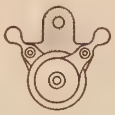
Part No.	*Code Markings	List Price
15262	B-1, H-1, H-9, H-20	$1.00
15263	B-2, H-2	.90
15640	H-16	1.00
15770	H-15	1.00
15780	H-17	1.10
15790	H-18, H-21	1.00
15837	B-3 (Superseded by 16233)	
15870	B-7, L-28	1.00
16060	H-24, L-29 (304) (Superseded by 18350)***	
16233	H-4, H-10	.90
16461	H-6, H-12	.75
16462	H-5, H-11	1.00
16490	B-6, L-12	1.00
16745	H-7, H-8, H-13	1.00
16828	B-5	.50
16880	H-23, L-26 (439)	1.10
16940	H-22, L-10	1.10
17360	H-27, L-32	1.10
17370	H-25, H-26, L-3, L-39	1.10
18350	H-28, L-49	1.10
19150	H-29	1.00
19160	H-30	1.00
19560	H-31	1.00

Part No.	*Code Markings	List Price
19690	H-32	$1.00
19710	H-33	1.00
19980	H-34	1.00
19990	H-35	1.00
20010	B-8	1.00
20350	H-36	1.00
20830	L-B-9, J-2, J-1	2.00
21170	H-37	1.00
21180	H-38	1.00
21250	B-9	1.00
21430	H-39, L-37-A	1.00
21440	H-40, L-44-A	1.00
21450	B-10, L-36-A	.50
21530	L-42-A, B-11	1.00
22050	H-41	1.00
22570	J-3	2.00
23140	J-4	2.00
23310	H-42 (Superseded by 21180)**	
23330	H-43	1.00
23590	L-55-A, H-44	1.00
23610	L-57-A, H-45	1.00
24250	LB-30, J-5	2.00
25690	LB-34	2.00

*For information about code markings, see Page 253 in the Service Manual.

**Do not use 23310 in place of 21180.

***See note on Page 243.



IDENTIFICATION OF SMALL FIXED CONDENSERS OF TYPE ILLUSTRATED AT LEFT

Part No.	Identification	List Price
17440	Copper washers, 7 plates	$ .50
17470	"X" scratched on fibre, 4 plates	.35
17974	Aluminum washers, 4 plates	.35
21160	Black-finished washers, 4 plates	.35

Part No.	Identification	List Price
22220	Brass-washers, 3 plates	$ .35
25650	Black-finished washers, 6 plates	.50
26440	Black-finished washers, 4 plates, enlarged mounting hole	.35

THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

TABLE OF VOLTAGES ACROSS BLEEDER RESISTORS IN MODELS
85-Q, 86, 87, 89, 90, 92, 92-F, 93, 94, 96, 96-F, 99, 99-F, 99-P

The voltages listed in this table are only approximate, and are measured values, not actual operating values.
Use 250-volt scale of a 1,000-ohm-per-volt D. C. voltmeter.
Turn volume control to maximum.

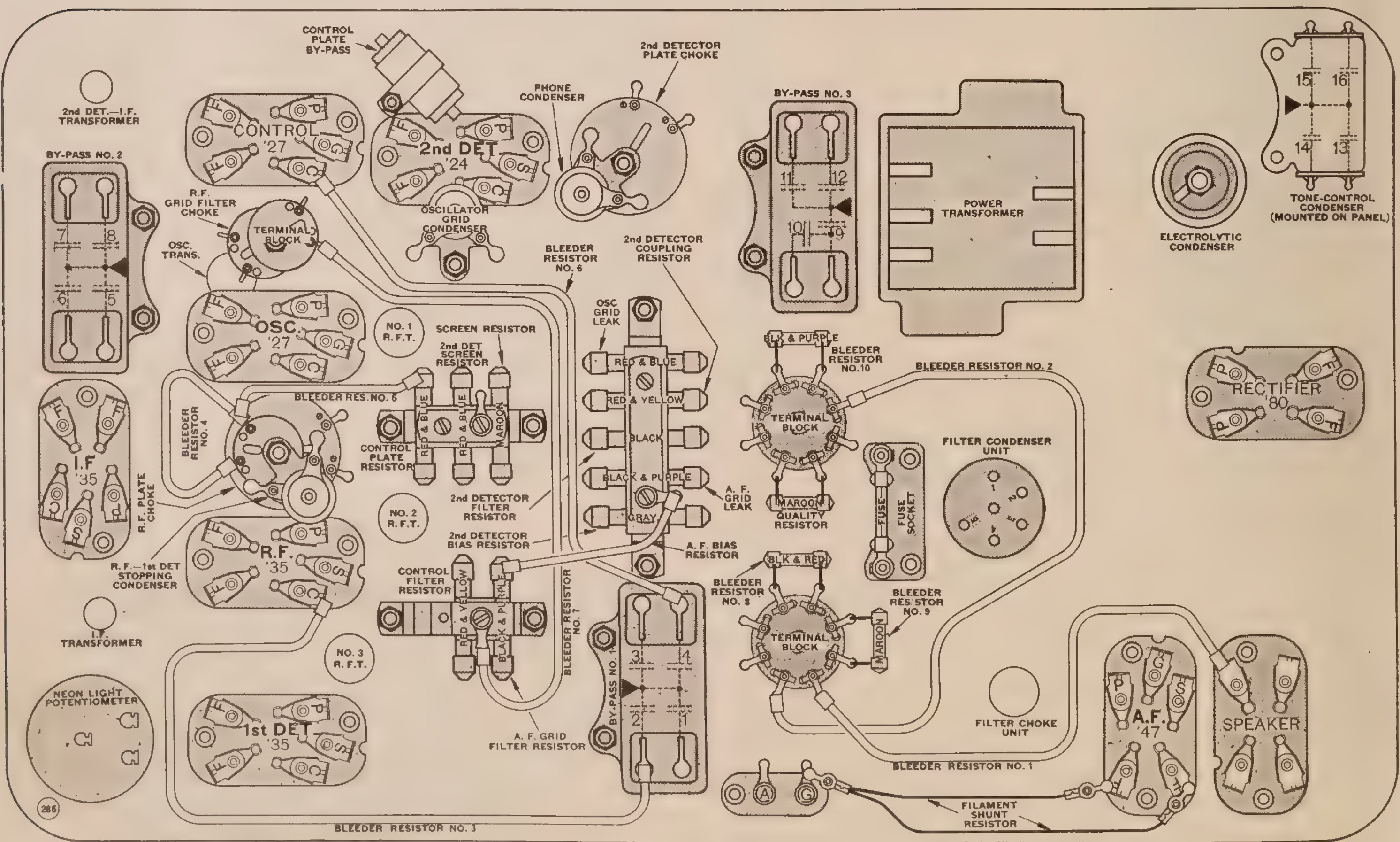
In all sets equipped with sensitivity switch, voltage switch, or neon tuning light potentiometer: Before making measurements, place sensitivity switch in NORMAL position, voltage switch in REDUCED VOLTAGE position, or neon tuning light potentiometer in full counter-clockwise position.

Line voltage=110 volts.

Bleeder Resistor No.	85-Q 2nd Type	86 2nd Type	87 3rd Type	89 3rd Type	90	92	92-F	93	94	96 1st Type	96 2nd Type	96 3rd Type	96-F	99 1st Type	99 2nd Type	99 3rd Type and 99-P	99-F
1	45	65	80	60	74*	68	72	75	95	70	90	80	97	82	93	62	50
2	9	47	45	55	60*	50	48	70	100	50	45	1	54	55	70	115	95
3	15	5	2	8	50	5	5	20	3	5	4	1	5	50	42	8	6
3-A	—	4	7	6	—	—	—	—	—	—	—	—	—	—	—	—	—
4	—	3	—	1	2	1	2	—	—	5	4	5	5	8	6	1	1
5	—	50	—	48	—	3	—	—	—	2	1	50	1	5	3	5**	5
6	—	5	—	5	—	62	70	—	—	65	55	32	66	1	1	60	45
7	—	5	—	25	—	15	18	—	—	17	15	112	17	60	49	15	15
8	—	—	—	—	—	—	—	—	—	32	28	—	50	7	7	22	22
9	—	—	—	—	—	—	—	—	—	32	33	—	7	26	27	47	37
10	—	—	—	—	—	—	—	—	—	38	95	—	125	33	24	5	1
11	—	—	—	—	—	—	—	—	—	2	—	—	—	25	35	170	122
12	—	—	—	—	—	—	—	—	—	60	—	—	—	5	98	—	—
13	—	—	—	—	—	—	—	—	—	—	—	—	—	10	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—	—	90	—	—	—

* The readings across No. 1 and No. 2 bleeders in Model 90 may be reversed; see note under diagram of Model 90.
** Bleeder No. 5 is not used in 99-P and the grid voltage of the '35 tubes is lower than indicated.

MODEL 96-F BOTTOM CHART


CONTROL PLATE BY-PASS
2nd DETECTOR PLATE CHOKE
PHONE CONDENSER
BY-PASS NO. 3
2nd DET.—I.F. TRANSFORMER
BY-PASS NO. 2
CONTROL '27
2nd DET '24
OSCILLATOR GRID CONDENSER
R.F. GRID FILTER CHOKE
TERMINAL BLOCK
OSC. TRANS.
BLEEDER RESISTOR NO. 6
2nd DETECTOR COUPLING RESISTOR
POWER TRANSFORMER
ELECTROLYTIC CONDENSER
TONE-CONTROL CONDENSER (MOUNTED ON PANEL)
OSC. '27
NO. 1 R.F.T.
SCREEN RESISTOR
2nd DET SCREEN RESISTOR
OSC GRID LEAK
RED & BLUE
RED & YELLOW
BLACK
BLACK & PURPLE
GRAY
BLK & PURPLE
BLEEDER RESISTOR NO. 10
BLEEDER RESISTOR NO. 2
RECTIFIER '80
BLEEDER RES. NO. 5
BLEEDER RESISTOR NO. 4
CONTROL PLATE RESISTOR
MAROON
I.F. '35
R.F. PLATE CHOKE
NO. 2 R.F.T.
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR BIAS RESISTOR
A. F. GRID LEAK
QUALITY RESISTOR
FUSE
FUSE SOCKET
FILTER CONDENSER UNIT
A. F. BIAS RESISTOR
R.F. '35
R.F.—1st DET STOPPING CONDENSER
CONTROL FILTER RESISTOR
BLEEDER RESISTOR NO. 7
BLK & RED
BLEEDER RESISTOR NO. 8
BLEEDER RES'STOR NO. 9
I.F. TRANSFORMER
NO. 3 R.F.T.
BY-PASS NO. 1
NEON LIGHT POTENTIOMETER
1st DET '35
A. F. GRID FILTER RESISTOR
FILTER CHOKE UNIT
A.F. '47
SPEAKER
BLEEDER RESISTOR NO. 1
FILAMENT SHUNT RESISTOR
BLEEDER RESISTOR NO. 3
A
G
286

VOLTAGE TABLE FOR MODELS

81, 81-B, 81-C, 82-D, 82-Q, 85-Q, 86, 87, 89, 90, 92, 92-F, 93, 94, 96, 96-F, 99, 99-F, 99-P

The voltages listed in this table are only approximate, and are measured values, not actual operating values.
Use 250-volt scale of a 1,000-ohm-per-volt D. C. voltmeter.
Turn volume control to maximum.

In all sets equipped with sensitivity switch, voltage switch, or neon tuning light potentiometer: Before making measurements, place sensitivity swtich in NORMAL position, voltage switch in REDUCED VOLTAGE position, or neon tuning light potentiometer in full counter-clockwise position.

All plate, screen and grid measurements are made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

Line voltage=110 volts.

		81 81-B 81-C	82-D 2nd Type	82-Q 2nd Type	85-Q 2nd Type	86 2nd Type	87 3rd Type	89 3rd Type	90	92	92-F	93**	94	96 1st Type	96 2nd Type	96 3rd Type	96-F	99 1st Type	99 2nd Type	99 3rd Type and 99-P	99-F
R. F. Tube	Filament	5.5	—	2	2	2.4	2.4	2.4	2.4	2.4	2.4	—	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	125	—	125	132	122	160	120	210	120	125	—	190	100	150	205	195	130	135	215	180
	Screen	75	—	60	62	45	80	50	75	45	35	—	100	45	40	70	50	55	45	85	70
	Grid	1	—	3	4	4	8	4	2	2	2	—	3	3	3	3	3	3	3	4	3
1st Det. Tube	Filament	5.5	5.5	2	2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	95	70	125	132	112	160	115	200	115	120	90	185	110	135	150	150	105	110	255	210
	Screen	—	50	40	40	40	80	40	70	40	30	20	90	40	35	70	45	40	35	70	55
	Grid	7	5	3	4	6	8	7	7	5	5	1	10	5	4	4	5	7	5	8	6
I. F. Tube	Filament	—	6	2	2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	—	95	125	132	115	160	120	205	120	125	115	190	100	150	205	195	130	135	215	180
	Screen	—	50	60	62	45	80	50	75	45	35	—	100	45	40	70	50	55	45	85	70
	Grid	—	1	3	4	4	8	4	2	2	2	3	3	3	3	3	3	3	3	4	3
2nd Det. Tube	Filament	—	5.5	2	2	2.4	2.4	2.4	2.4	2.4	2.4	—	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	—	55	45	43	80	90	110	95	90	90	—	80	95	95	90	105	110	105	100	80
	Screen	—	10	25	28	40	—	—	35	50	55	—	65	55	45	30	50	—	—	—	—
	Grid	—	2	3	3	6	4	15	7	7	7	—	8	7	7	5	7	15	15	14	12
1st A. F. Tube	Filament	5.5	5.5	2	2	2.4	2.4	2.4	2.4	2.4	2.4	—	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	120	75	55	67	175	100	115	200	195	205	—	185	200	200	195	225	110	115	120	100
	Screen	123	—	—	—	185	—	—	210	205	215	—	195	210	210	205	235	—	—	—	—
	Grid	11	3	3	3	4	3	5	4	5	5	—	6	3	4	4	4	4	4	4	4
2nd A. F. Tube	Filament	—	2	2	2	—	2.4	2.4	—	—	—	—	—	—	—	—	—	2.4	2.4	2.4	2.4
	Plate	—	85	120	127	—	185	210	—	—	—	—	—	—	—	—	—	215	215	215	210
	Screen	—	90	125	132	—	190	215	—	—	—	—	—	—	—	—	—	225	225	225	220
	Grid	—	7	15	15	—	12	14	—	—	—	—	—	—	—	—	—	15	15	12	11
Osc. Tube	Filament	—	5	2	2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	—	100	60	62	80	80	90	75	80	85	110	100	80	70	80	80	75	65	115	90
	Grid	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Control Tube	Filament	5.5	—	—	—	2.4	—	2.4	—	2.4	2.4	—	—	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Plate	3	—	—	—	25	—	25	—	35	40	—	—	40	35	30	40	30	24	30	23
	Screen	—	—	—	—	5	—	5	—	—	—	—	—	—	—	—	—	7	7	15	14
	Grid	2	—	—	—	3	—	3	—	15	17	—	—	17	15	3	15	4	4	3	3

* The measured oscillator grid voltage will vary dependent on several factors. In some cases, no reading will be secured for grid bias. In other cases the reading will be only slight, or it may be as high as 10 volts.

** In Model 93, make measurements with frequency range switch turned to low frequency scale.

PARTS AND PRICE LIST, MODEL 81-B, No. 25600, MOTOR CAR RADIO

Note: All parts not listed below will be found under Model 81, No. 20300, on pages 308, 309.

Part No.	Name of Part	List Price	Part No.	Name of Part	List Price
21929	Chassis container, complete	$ 4.00	21837	Antenna cable bushing	$ .05
21915	Container, less cover and accessories	2.50	22027	Antenna cable bushing clamp	.05
21918	Container cover	1.00	21847	Shielded "B" battery cable 8′ 10″	1.00
21823	Thumb screw	.05	22247	Shielded "B" battery cable, per foot	.12
21062	Mounting bolt	.10	21068	"B" battery cable bushing	.05
21142	Mounting washer	.01	22018	Speaker-to-chassis cable bushing clamp (outside)	.05
21824	Mounting nut	.02	22019	Speaker-to-chassis cable bushing clamp (inside)	.05
21838	Antenna cable	.25			

PARTS AND PRICE LIST, MODEL 81-C, No. 25700, MOTOR CAR RADIO

Note: All parts not listed below will be found under Model 81, No. 20300, on pages 308, 309.

Part No.	Name of Part	List Price	Part No.	Name of Part	List Price
21931	Chassis container, complete	$ 4.00	22247	Shielded "B" battery cable, per foot	$ .12
21938	Container, less lid and accessories	2.50	21068	"B" battery cable bushing	.05
21939	Container lid	.75	22027	"B" battery cable bushing clamp	.05
21061	Mounting bolt 13″ long	.10	21838	Antenna cable	.25
21142	Mounting bolt washer	.01	21837	Antenna cable bushing	.05
21141	Mounting bolt lock washer	.70/c	22027	Antenna cable bushing clamp	.05
21064	Wing nut	.05	22018	Speaker-to-chassis cable bushing clamp (outside)	.05
21943	Mounting strap 1¾″ x 12″	.10	22019	Speaker-to-chassis cable bushing clamp (inside)	.05
21847	Shielded "B" battery cable 8′ 10″	1.00			

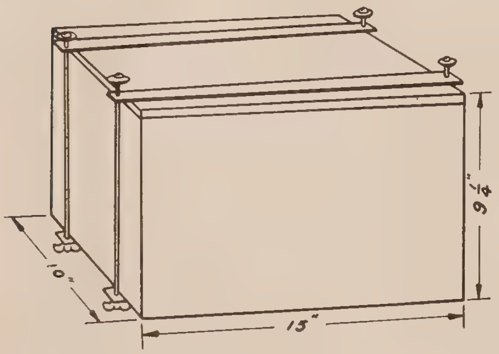
PARTS & PRICE LIST, MODEL 81-B & 81-C "B" BATTERY CONTAINERS

LONG TYPE No. 21932

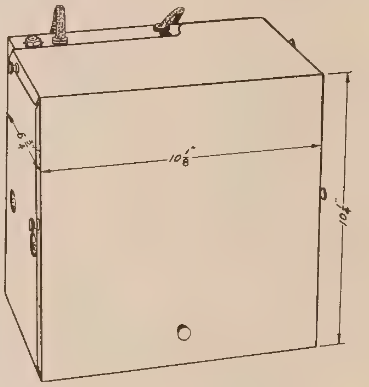
Part No.	Name of Part	List Price
21932	Long "B" battery container, complete	$ 3.50
21928	Container, less lid and accessories	2.50
21924	Container lid	1.00
22712	Gasket rubber, per foot	.05
21068	"B" battery cable bushing	.05
22027	"B" battery cable bushing clamp	.05

SQUARE TYPE No. 21933

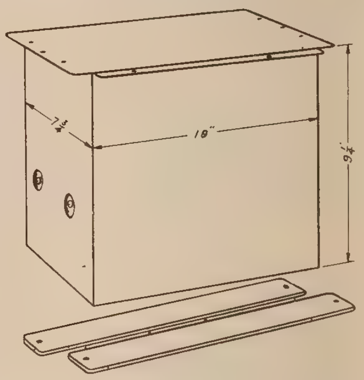
Part No.	Name of Part	List Price
21933	Square "B" battery container, complete	$ 3.50
21906	Container, less lid and accessories	2.50
21909	Container lid	1.00
21068	"B" battery cable bushing	.05
22027	"B" battery cable bushing clamp	.05



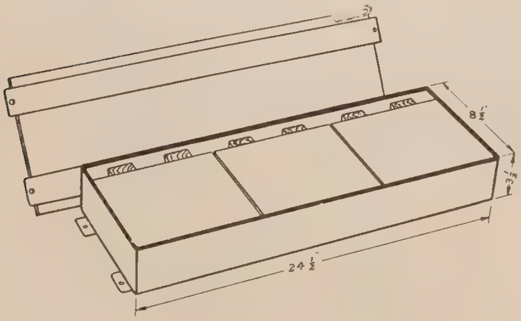
Model 81 Chassis and Battery Container.
(For under-floor mounting.)



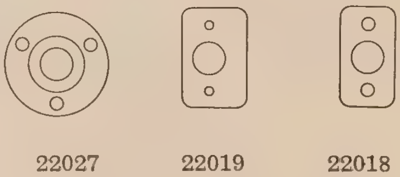
Model 81-B Chassis and "C" Battery Container No. 21929.
(For dash mounting.)



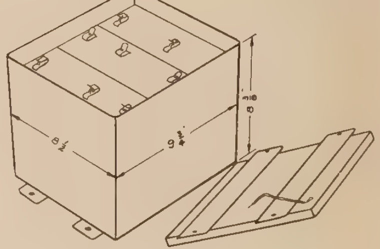
Model 81-C Chassis and "C" Battery Container No. 21931.
(Mounted under floor or through hole cut in floor.)



Long "B" Battery Container No. 21932 for Use with Model 81-B or 81-C.



Cable Bushing Clamps.



Square "B" Battery Container No. 21933 for Use with Model 81-B or 81-C.

THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST FOR MODEL 93, No. 27200 SHORT WAVE CONVERTER

Part No.	Name of Part	List Price
22263	CABINET, COMPLETE, WITH ESCUTCHEON	$ 6.50
19527	Cabinet feet	.12
22384	Escutcheon	.65
19552	Escutcheon rivet	.50/c
25750	Dial plate and bracket assembly	.65
22333	Dial plate	.30
15734	Dial plate rivet	.30/c
19644	Dial light 3.2 V	.25
17814	Dial knob	.30
25790	FREQUENCY RANGE SWITCH	2.50
17244	Frequency range switch knob	.30
25710	ANTENNA AND ON-OFF SWITCH, WITH BRACKET	2.50
17461	Antenna switch	1.00
13664	On-off switch	1.00
17244	Antenna and on-off switch knob	.30
25780	POWER TRANSFORMER	7.50
17824	Power transformer cover	.50
17825	Power transformer cover spring	.10
25730	Oscillator transformer	1.50
19502	Oscillator transformer mounting bracket	.10
22442	Antenna transformer primary	.50
22441	Antenna transformer secondary	1.50
22476	Antenna transformer insulating sheet	.02
19502	Antenna transformer mounting bracket	.10
22538	ELECTROLYTIC CONDENSER, No. 1	2.50
19728	Electrolytic condenser No. 2	2.60

SMALL FIXED CONDENSERS

Part No.	Name of Part	List Price
16360	Compensating condenser (2 used on ant. trans. sec.)	.10
25650	Oscillator tracking condenser No. 1.	.35
22365	Oscillator tracking condenser No. 2 (blue and yellow dots)	.30
22366	Oscillator tracking condenser No. 3 (gray and yellow dots)	.30
22220	Antenna condenser	.35
22220	S. W. detector grid condenser	.35
21160	Detector-I. F. stopping condenser	.35
17440	Oscillator plate condenser	.50
21160	Converter coupling condenser	.35

CHOKES

Part No.	Name of Part	List Price
25810	Filter choke unit	$ 2.25
22494	S. W. detector plate choke	.25
21877	S. W. detector plate choke shield	.30
22037	Shield cover	.05
26510	Antenna choke	.50

TRIMMER CONDENSERS

Part No.	Name of Part	List Price
25830	S. W. detector plate trimmer	.70
25670	Oscillator trimmers No. 1, 2 and 3, complete with base	1.10
22355	Oscillator trimmers No. 1, 2 or 3, unmounted	.25
22201	Trimmer mica	.03
22202	Fibre base for oscillator trimmers No. 1, 2 and 3	.25
20190	Oscillator trimmer No. 4	.50
22662	VARIABLE CONDENSER ROTOR, STATOR & FRAME.	3.00
20235	Rotor connection (long)	.10
18809	Dial knob shaft	.05
20116	Dial knob shaft bracket	.30
17961	Dial rubber and bushing	.15
20149	Dial gear and balance weight	.75
22353	Dial pointer	.05
18823	Dial pointer shim	.02
20119	Trimmer mica	.03

FLEXIBLE RESISTORS

Part No.	Name of Part	List Price
25720	Antenna resistor	.15
24450	Bleeder resistor No. 1	.20
24450	Bleeder resistor No. 2	.20
21030	Bleeder resistor No. 3	.20
16320	I. F. bias resistor	.20

SOCKETS

Part No.	Name of Part	List Price
20236	Det., I. F. and osc. socket	.30
21448	Rectifier socket	.30
17377	Socket insulator	.25/c

MISCELLANEOUS PART

Part No.	Name of Part	List Price
22332	Shielded antenna lead	.25
15622	Rubber bushing	.05
25680	110 V. plug receptacle	.60
19566	110 V. double conductor cable and plug	1.90
16741	Insulating bushing	.05
16742	Bushing retaining spring	.05
19536	Antenna binding post	.20
8215	Ground binding post	.20
18363	Binding post base	.05
22095	Rubber pad 11/16″ x ¾″	.01
22618	Tube shield	.15
22611	Instruction sheet F-1001 .... Net	.01
22396	Panel instruction card F-970 .... “	.01
22393	Shipping container .... “	.55

THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST FOR LATER MODELS 82-D, 82-Q, 85-Q, 86, 87 AND 89

ALL PARTS NOT LISTED BELOW WILL BE FOUND ON PAGES 310 TO 317

NAME OF PART	Model 82-D Above Serial No. 5760301	Model 82-Q Above Serial No. 2550940	Model 85-Q Above Serial No. 163767	Model 86 Above Ser. No. 5876861 Model 86-F Above Ser. No. 7168925	Model 87 Above Serial No. 2525871	Model 89 Above Ser. No. 6755181 Model 89-F Above Ser. No. 1585395 Model 89-P Above Ser. No. 1935904
R. F. TRANSFORMER group		22436 $3.00	21951 $3.00	21868 $3.00	21868 $3.00	21868 $3.00
Oscilator transformer		25530 1.25				
2nd-detector I. F. transformer, less trimmers	22059 $2.00	22304 2.00	20713 2.00			
I. F. transformer shield	21877 .30	22371 .30				
Cardboard cover for I. F. T. shield	22037 .05	22037 .05				
VARIABLE CONDENSER ROTOR, STATOR AND FRAME		22438 5.00		21802 9.60	21802 9.60	21802 9.60
R. F.-1st detector stopping condenser			21160 .35			
Osc. plate filter condenser or 2nd det.—1st A. F. cplg. cond.	23250 .35	23250 .35				
Condenser clamp	22057 .05	22057 .05				
Double I. F. trimmer condenser	24760 .95	24760 .95				
Antenna trimmer base	21945 .55	21945 .55	21945 .55			
Mica disc insulator (large)	19186 .01	19186 .01	19186 .01			
Mica disc insulator (small)	19236 .01	19236 .01	19236 .01			
Antenna trimmer adjusting knob	8932 .05	8932 .05	8932 .05			
R. F. or 1st-detector plate or grid filter choke	19210 .25	19210 .25	19210 .25			19210 .25
R. F. plate choke			17015 .50			
BLEEDER RESISTOR No. 3A				23780 .20	17380 .20	16320 .20
Bleeder resistor No. 4				20050 .20		
Filament-series resistor No. 1	25980 1.00					
Filament-series resistor No. 1A	25990 1.00					
ON-OFF SWITCH		22272 1.25				
On-Off switch knob		21963 .20				
Sensitivity switch		20983 1.50		13664 1.00	13664 1.00	13664 1.00
Sensitivity switch base				21793 .05	21793 .05	21793 .05
Sensitivity switch label				21749 .01 Net	21749 .01 Net	21749 .01 Net
R. F. SOCKET			20237 .25			
Speaker socket	21337 .35	21451 .30	21451 .30		21337 .35	21337 .35
Rectifier socket					21448 .30	21448 .30
Rubber pad, 1¹⁄₁₆″ x ¾″	22095 .01	22095 .01				
Rubber pad, 1″ x 1″			22095A .01	22095A .01	22095A .01	22095A .01
Wooden wedge	21202 .01	21202 .01				
Instruction and log card for 60-cycle, battery and D. C. models	22342 F-966 .01 Net	22222 F-950 .01 Net		21789 F-864 .01 Net	21831 F-871 .01 Net	21791* F-865 .01 Net
Instruction and log card for 25-cycle models				21795 F-866 .01 Net		21796 F-867 .01 Net

*Instruction and log card for Model 89-P above Serial 1935904 is Part No. 21797, F-868, .01 net.

THESE PRICES SUPERSEDE ALL PREVIOUS PRICES AND ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST
FOR MODELS 90, 92, 94, 96, 99

NAME OF PART	Model 90, 90-F	Model 92, 92-F	Model 94, 94-F	Model 96-F and 1st and 2nd Type 96	Model 96 3rd Type	Model 99 1st and 2nd Types	Model 99-F and 3rd Type 99
CABINET, Complete	22287 $7.60	22288 $7.60					
Cloth screen	20596 .75	20596 .75	18959 $1.00	18959 $1.00	18959 $1.00	18959 $1.00	18959 $1.00
Cabinet feet	19527 .12	19527 .12					
FRONT PANEL, with braces and escutcheon			22191 2.50	22274 2.50	22274 2.50	22097 2.50	22097* 2.50
Front-Panel brace			17224 .10	17224 .10	17224 .10	17224 .10	17224 .10
ESCUTCHEON	22029 .65	22028 .65	21981 .65	21995 1.00	21995 1.00	21961 1.00	21961 1.00
Escutcheon rivet	19552 .50/c	19552 .50/c	8272 .02	8272 .02	8272 .02	8272 .02	8272 .02
DIAL PLATE AND BRACKET ASSEMBLY	19750 .65	19750 .65	19750 .65				
Dial-light socket and reflector				16420A .40	16420A .40	16420A .40	16420A .40
Dial plate	18882 .30	18882 .30	18882 .30	18017 .30	18017 .30	18017 .30	18017 .30
Dial-plate rivet	15734 .30/c	15734 .30/c	15734 .30/c	18295 .30/c	18295 .30/c	18295 .30/c	18295 .30/c
Dial lamp	19644 .25	19644 .25	19644 .25	19644 .25	19644 .25	19644 .25	19644 .25
Dial knob	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30	17814 .30
VOLUME CONTROL, complete less leads	20840 2.75	20389 3.45	22650 2.75	20389 3.45	20389 3.45	20389 3.45	20389 3.45
Volume-control mounting bracket			19777 .20	21965 .20	21965 .20	21965 .20	21965 .20
Volume-control mounting insulation	20135 .05						
Volume-control mounting nut	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03	20093 .03
Volume-control knob	17244 .30	17244 .30	17244 .30	22052 .30	22052 .30	22052 .30	22052 .30
TONE-CONTROL Condenser		20010 1.00	20010 1.00	20010 1.00	20010 1.00	21530 1.00	21530 1.00
Tone-control condenser clamp			18223 .05	18223 .05	18223 .05	18223 .05	18223 .05
Tone-control switch, complete	20730 .75	20730 .75	20730 .75	20730 .75	20730 .75	24540 .75	24540 .75
Tone-control-switch base	20274 .60	20274 .60	20274 .60	20274 .60	20274 .60	18148 .60	18148 .60
Tone-control-switch shaft and blade	22297 .15	22297 .15	22297 .15	22297 .15	22297 .15	22297 .15	22297 .15
Tone-control-switch shaft key	20096 .30/c	20096 .30/c	20096 .30/c	20096 .30/c	20096 .30/c	20096 .30/c	20096 .30/c
Tone-control-switch knob	17244 .30	17244 .30	17244 .30	21963 .20	21963 .20	21963 .20	21963 .20
NEON TUNING LIGHT				22011 2.00	22011 2.00	22011 2.00	22011 2.00
Neon tuning light socket				21959 .70	21959 .70	21959 .70	21959 .70
Neon tuning light socket insulator				21898 .01	21898 .01	21898 .01	21898 .01
Neon tuning light socket mounting strap				21899 .05	21899 .05	21899 .05	21899 .05
Neon tuning light clamping spring				22039 .05	22039 .05	22039 .05	22039 .05
ADJUSTMENT POTENTIOMETER for neon tuning light				22152 2.50	22345 2.50	22152 2.50	22344 2.50
Adjustment potentimeter knob				21963 .20	21963 .20	21963 .20	21963 .20
Adjustment potentiometer label				22139 .01 Net	22139 .01 Net	22139 .01 Net	22139 .01 Net

* Front panel for Model 99-F is Part No. 22492; $2.50 list.

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

April, 1932.

PARTS AND PRICE LIST (Continued)
FOR MODELS 90, 92, 94, 96, 99

NAME OF PART	Model 90, 90-F	Model 92, 92-F	Model 94, 94-F	Model 96-F and 1st and 2nd Type 96	Model 96 3rd Type	Model 99 1st and 2nd Types	Model 99-F and 3rd Type 99
POWER TRANSFORMER, 60 cycle	20890 $7.50	24860 $7.50	24870 $7.50	23430 $7.50	23430 $7.50	21660 $8.25	25640 $8.25
Power transformer, 25 cycle	23190 9.50	23560 9.50	23560 9.50	23560 9.50			22610 10.75
Power Transformer, 220 volts	23040 11.50	23060 11.50					
Power-transformer cover or lid, 60 cycle	17824 .50	17824 .50	17824 .50	17824 .50	17824 .50	17824 .50	17824 .50
Power-transformer-cover spring, 60 cycle	17825 .05	17825 .05	17825 .05	17825 .05	17825 .05	17825 .05	17825 .05
Power-transformer cover or lid, 25 cycle	20469 .50	17824 .50	20469 .50	20469 .50			21032 .50
AUDIO INPUT TRANSFORMER						21670 3.75	21670 3.75
R. F. TRANSFORMER group	22188 2.00	22188 2.00	22189 3.00	22275 3.00	22275 3.00	22072 3.00	22072 3.00
R. F. Transformer cap (aluminum)			19443 .05	19443 .05	19443 .05	19443 .05	19443 .05
R. F. Transformer shield	21871 .30	21871 .30	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50
OSCILLATOR TRANSFORMER	24790 1.25	24790 1.25	24940 1.25	25050 1.25	25050 1.25	21580 1.25	25870 1.25
Oscillator-transformer shield	20313 .50	20313 .50	20313 .50	20313 .50	20313 .50	20313 .50	20313 .50
I. F. transformer, less trimmers				20716 2.00	20716 2.00	20716 2.00	20716 2.00
2nd detector I. F. transformer, less trimmers	22059 2.00	22061 2.00	19573 2.00	22063 2.00	22063 2.00	21949 2.00	21949 2.00
I. F. transformer shield	21877 .30	21877 .30	17295 .50	17295 .50	17295 .50	17295 .50	17295 .50
Cardboard cover for I.F.T shield	22037 .05	22037 .05					
Cardboard inner tube for I.F.T. shield			22343 .05	22343 .05	22343 .05	22343 .05	22343 .05
FILTER-CHOKE UNIT				24930 5.75	24930 575	21680 5.75	21680 5.75
Filter-choke cover or lid						17302 .20	17302 .20
R. F. plate choke			17015 .50	17015 .50	17015 .50	17015 .50	17015 .50
1st-detector plate choke	20307 1.00	20307 1.00	20307 1.00				
R. F. grid filter or cathode choke		19210 .25		19210 .25	19210 .25	19210 .25	19210 .25
I. F. stopping choke	19210 .25	19210 .25	19210 .25				
I. F. plate filter choke						19210 .25	19210 .25
I. F. grid choke	17390 .60	17390 .60	17390 .60				
1st-detector grid filter choke		19210 .25					
2nd-detector plate or A. F. grid choke	17390 .60	17390 .60	17390 .60	17390 .60	17390 .60		
1st-detector plate filter choke	19210 .25	19210 .25	19210 .25				
FILTER CONDENSER UNIT, paper and foil type			20370 7.50	15850† 7.95	15850 7.95	21520 7.95	21520** 7.95
Filter-condenser cover and spring			20398 .45	18188 .45	18188 .45	18188 .45	18188 .45
Filter condenser No. 1 (Electrolytic)	19728 2.60	19728 2.60	19060 2.50	19060 2.50	19060 2.50		
Filter condenser No. 2 (Electrolytic)	19060 2.50	19060 2.50					
Fibre insulating case for electrolytics	19551 .10	19551 .10					
Dry electrolytic condenser		22397* 1.70					22646 .75
Dry electrolytic condenser clamp		22346* .05					22388 .05

* Used in 92-F only.

** Filter condenser unit for Model 99-F is Part No. 25130; $9.95 list. Condenser cover = No. 16396; cover spring = No. 15833.

† Filter condenser unit for Model 96-F is Part No. 25190; $9.95 list. Condenser cover = No. 15327; cover spring = No. 15833; condenser lid = No. 15322.

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)
FOR MODELS 90, 92, 94, 96, 99

NAME OF PART	Model 90, 90-F	Model 92, 92-F	Model 94, 94-F	Model 96-F and 1st and 2nd Type 96	Model 96 3rd Type	Model 99 1st and 2nd Types	Model 99-F and 3rd Type 99
MOUNTING ACCESSORIES FOR ELECTROLYTICS							
Clamp for electrolytics with fibre case	19936 .10	19936 .10					
Clamp for electrolytics without fibre case	19716 .10	19716 .10	19716 .10	19716 .10	19716 .10		
Clamp screw	19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c	19543 .25/c		
Clamp nut	19784 .01	19784 .01	19784 .01	19784 .01	19784 .01		
Clamp rivet	17068 .01	17068 .01	17068 .01	17068 .01	17068 .01		
SMALL FIXED CONDENSERS (See page 361 for identification.)							
R. F.-1st detector stopping condenser				21160 .35	21160 .35		
Oscillator grid condenser	21160 .35	21160 .35	21160 .35	21160 .35	21160 .35	21160 .35	21160 .35
I. F. stopping condenser	21160 .35	21160 .35	21160 .35				
Phone condenser		17440 .50		17440 .50	17440 .50		
A. F. grid condenser						22220 .35	22220 .35
Control grid condenser					22220 .35		
Grid circuit by-pass condenser	26490 .50		26490 .50				
Grid circuit by-pass condenser clamp	22433 .05		22433 .05				
Control plate by-pass condenser		23250 .35		23250 .35	23250 .35		
Control plate by-pass condenser clamp		22057 .05		22057 .05	22057 .05		
TRIMMER CONDENSERS							
Single I. F. trimmer	20190 .50	20190 .50	19330 .70				
Double I. F. trimmer	24760 .95	24760 .95	18150 .95	18150 .95	18150 .95	18150 .95	18150 .95
Trimmer-condenser sealing wax (used in all sets)	.50/lb.						
MULTIPLE-TYPE BY-PASS CONDENSER (other by-pass condensers are listed on page 361)	20830 2.00	24250 2.00	24250 2.00				
VARIABLE CONDENSER ROTOR, STATOR AND FRAME	21096 6.00	21096 6.00	21097 6.00	22209 9.60	22209 9.60	21802 9.60	21802 9.60
Rotor connection, long	20235 .10	20235 .10	20235 .10	18844 .10	18844 .10	18844 .10	18844 .10
Rotor connection, short				20796 .10	20796 .10	20796 .10	20796 .10
Stopping spring				19968 .12	19968 .12	19968 .12	19968 .12
Dial-knob shaft	18809 .05	18809 .05	18809 .05	17941 .05	17941 .05	17941 .05	17941 .05
Dial-knob shaft bracket	20116 .30	20116 .30	20116 .30	18144 .35	18144 .35	18144 .35	18144 .35
Dial-knob-shaft-bracket support				17935 .03	17935 .03	17935 .03	17935 .03
Dial rubber and bushing	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15	17961 .15
Dial pointer	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05	17959 .05
Dial-pointer shim	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02	18823 .02
Dial gear and balance weight	20149 .75	20149 .75	20149 .75				
Dial gear				18615 .40	18615 .40	18615 .40	18615 .40
Balance weight				18117 .35	18117 .35	18117 .35	18117 .35

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)
FOR MODELS 90, 92, 94, 96, 99

NAME OF PART	Model 90, 90-F	Model 92, 92-F	Model 94, 94-F	Model 96-F and 1st and 2nd Type 96	Model 96 3rd Type	Model 99 1st and 2nd Types	Model 99-F and 3rd Type 99
Pointer control arm				17962 .30	17962 .30	17962 .30	17962 .30
Trimmer mica	20119 .03	20119 .03	20119 .03	17062 .03	17062 .03	17062 .03	17062 .03
FLEXIBLE AND WIRE-WOUND RESISTORS (for tubular resistors, see page 361).							
1st-detector bias resistor	21030 .20		21030 .20		16320 .20		
R. F. bias resistor			19820 .20				
1st A. F. bias resistor							24470 .20
A. F. bias resistor				24980 .20	25840 .20	21420 .20	
Filament shunt resistor	17077 .15	17077 .15	17077 .15	17077 .15	17077 .15	17077 .15	17077 .15
Bleeder resistor No. 1		24340 .20	24470 .20	24340 .20	24340 .20	24340 .20	24340 .20
Bleeder resistor No. 2		24450 .20	24450 .20	24450 .20	18520 .20	24340 .20	
Bleeder resistor No. 3		23780 .20	18520 .20	17380 .20	18520 .20	24340 .20	16320 .20
Bleeder resistor No. 4	20040 .20	20040 .20		20050 .20	21420 .20	21030 .20	20040 .20
Bleeder resistor No. 5		17380* .20		20040 .20	25850 .20	23780 .20	20050** .20
Bleeder resistor No. 6		24340 .20		24340 .20		20040 .20	24470 .20
Bleeder resistor No. 7		21030 .20		21030 .20		24340 .20	25950 .20
Bleeder resistor No. 8					24450 .20	20120 .20	25840 .20
Bleeder resistor No. 9						24530 .20	
Filter resistor		19180* 1.00	19180* 1.00				
SOCKETS							
R. F., I. F., oscillator, 1st detector, 2nd detector, 1st A. F., pentode and automatic volume control socket	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30	20236 .30
Rectifier socket	21448 .30	21448 .30	21448 .30	21448 .30	21448 .30	21448 .30	21448 .30
Speaker socket	21336 .30	21336 .30	21336 .30	21336 .30	21336 .30	21337 .35	22412 .35
Socket insulator (fibre sheet)	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c	17377 .25/c
Socket eyelet	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c	8249 .50/c
Fuse socket		18449 .15	18449 .15	18449 .15	18449 .15	18449 .15	18449 .15
TUBE SHIELD	15213 .15	15213 .15	15213 .15	15213 .15	15213-G .15	15213 .15	15213-G .15
Tube-shield base	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03	15214 .03
Tube-shield base rivet	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c	16771 .30/c
110-VOLT DOUBLE-CONDUCTOR CABLE AND PLUG	19566 1.90	19566 1.90	19566 1.90	19566 1.90	19566 1.90	19566 1.90	19566 1.90
110-volt plug (male)	18897 .15	18897 .15	18897 .15	18897 .15	18897 .15	18897 .15	18897 .15
110-volt cable bushing	16741 .05	16741 .05	16741 .05	16741 .05	16741 .05	16741 .05	16741 .05
Bushing retaining spring	16742 .05	16742 .05	16742 .05	16742 .05	16742 .05	16742 .05	16742 .05

* Not used in 25-cycle sets.

** Not used in Model 99-P.

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)
FOR MODELS 90, 92, 94, 96, 99

NAME OF PART	Model 90, 90-F	Model 92, 92-F	Model 94, 94-F	Model 96-F and 1st and 2nd Type 96	Model 96 3rd Type	Model 99 1st and 2nd Types	Model 99-F and 3rd Type 99
BINDING-POST BASE	18363 .05	18363 .05	18363 .05	18363 .05	18363 .05	18363 .05	18363 .05
Binding post, marked "A"	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20	19536 .20
Binding post, ground	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20	8215 .20
SENSITIVITY SWITCH		20983 1.50		21958* 1.60	17242 1.00	21958 1.60	17242** 1.00
Sensitivity switch knob				21963 .20	21963 .20	21963 .20	21963 .20
Voltage switch				13664 1.00		13664 1.00	
Voltage switch label				21966 .01 Net		21966 .01 Net	
MISCELLANEOUS PARTS							
Self-tapping screw (⅜″ long)	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02	19547 .02
Self-tapping screw (⅞″ long)	21007 .02	21007 .02	21007 .02	21007 .02	21007 .02	21007 .02	21007 .02
Self-tapping screw (1″ long)	19717 .02	19717 .02	19717 .02	19717 .02	19717 .02	19717 .02	19717 .02
Line fuse (2 amperes)		18534 .05	18534 .05	18534 .05	18534 .05	18534 .05	18534 .05
Control-grid lead and cap	19623 .12	19623 .12	19623 .12	19623 .12	19623 .12	19623 .12	19623 .12
Fibre disc (1″ dia.) with two lugs (used as a terminal block for wire connections)			22530 .05	22530 .05	22530 .05	22530 .05	22530 .05
Rubber pad (1¹¹⁄₁₆″ x ¾″)	22095 .01	22095 .01	22095 .01				
Rubber pad (1″ x 1″)				22095A .01	22095A .01	22095A .01	22095A .01
Wooden wedge	21202 .01	21202 .01					
Multiple terminal block (8 lugs)	24110 .15	24110 .15	24110 .15	24110 .15	24110 .15	24110 .15	24110 .15
Bottom plate			19869 1.30	19869 1.30	19869 1.30	19869 1.30	19869 1.30
Ground clamp assembly	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30	13989 .30
Cardboard packing tube (fits on speaker field case)	19699 .10	19699 .10					
Instruction and log card for 60-cycle models	21985 F-880 .01 Net	21986 F-881 .01 Net	21987 F-882 .01 Net	21988 F-883 .01 Net	22136 F-894 .01 Net	21989 F-884 .01 Net	22137 F-895 .01 Net
Instruction and log card for 25-cycle models	22259 F-956 .01 Net	22261 F-957 .01 Net	22262 F-953 .01 Net				
Instruction folder					22351 F-968 .01 Net		22352 F-969 .01 Net
Panel instruction card	22046 F-886 .01 Net	22047 F-887 .01 Net	22048 F-888 .01 Net	22049 F-889 .01 Net	22049 F-889 .01 Net	22051 F-890 .01 Net	22051 F-890 .01 Net
Neon tuning light adjusting tag				22138 F-896 .01 Net	22138 F-896 .01 Net	22138 F-896 .01 Net	22138 F-896 .01 Net
Shipping container for 60-cycle, battery and D. C. models	22119 .55 Net	22121 .55 Net	22058 .65 Net	22122 .65 Net	22122 .65 Net	22014 .65 Net	22014 .65 Net
Shipping container for 25-cycle models	22265 .55 Net	22269 .55 Net	22266 .65 Net	22122 .65 Net			22268 .65 Net

* Sensitivity switch in Model 96-F is Part No. 17242; $1.00 list.

** Not used in Model 99-P.

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST FOR MODEL 99-P, NO. 27400 RECEIVER

NOTE.—All parts not listed below will be found under Model 99 (3rd Type) on page 367.
Phonograph parts will be found on page 239.

Part No.	Name of Part	List Price
22455	Volume control and radio-phono switch	$ 3.45
22422	Volume control mounting bracket	.20
22454	Phonograph post assembly	.45
17242	On-off switch	1.00
21963	On-off switch knob	.20
18589	110 V. double conductor cable and plug	$ 1.00
22443	Panel instruction card F-973...Net	.01
22444	Phonograph instruction sheet F-974...Net	.01
22446	Shipping container... “	.65

PARTS AND PRICE LIST FOR SPEAKERS USED IN MODELS 90, 92, 94, 96 AND 99

MODEL NUMBER OF SET	SPEAKER PART NUMBER	PARTS LIST
90, 90-F 92, 92-F	17300	Parts for No. 17300 speaker are listed on page 318, with the exception that in some late type No. 17300, the No. 19679 output transformer is replaced by the following parts: No. 21672 Output transformer, less case....$3.00 No. 21418 Output transformer case.... .40 No. 21424 Output transformer fibre insulator.... .02
94, 94-F 96, 96-F	26300	Parts for No. 26300 speaker are the same as used on the No. 24600 speaker listed on page 318.
99, below Serial No. 4884901 All 99-F	26400 (early type) below Serial No. 7803050	Parts for early-type No. 26400 speaker are the same as used on No. 19800 speaker listed on page 318.
99, above Serial No. 4884901 All 99-P	26400 (late type) above Serial No. 7803050	Parts for late-type No. 26400 speaker are the same as used on No. 19800 speaker listed on page 318, with the following exceptions: No. 18870 Field coil....$3.00 No. 22416 Speaker plug (green).... .65 No. 22349 Instruction tag.... .01 net

CORRECTION IN MODEL 80, 83 DIAGRAM

In the diagram of Models 80 and 83 on page 282 the chassis connection to the oscillator cathode and grid leak should be omitted. The oscillator grid leak should be connected to the cathode.

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ATWATER KENT RADIO

SERVICE DATA

With

PARTS AND PRICE LIST FOR

MODEL 91, 91-B, 91-C, 188, 188-F, 228, 228-F, 228-D, 228-Q, 260, 260-F, 469, 469-F, 567 and 567-F.

SERVICE DATA FOR NEW COMPACT MODELS

The compact Models 228, 228-F, 228-D, 228-Q, 567 and 567-F employ the same highly developed chassis and speakers as Model 92, 92-F, 82-D, 82-Q, 90 and 90-F, respectively. For diagrams and parts list on these new compact models, refer to the following pages:

INTERMEDIATE FREQUENCIES

Model 91, 91-B, and 91-C Super-Heterodyne Motor Car Radio has an intermediate frequency of 260 kilocycles. The 2nd harmonic of the regular 130 kilocycle oscillator may be used in aligning the I. F. trimmers on this model.

All other receivers described in this supplement employ the super-heterodyne circuit with an intermediate frequency of 130 kilocycles.

MODEL NUMBER	CHASSIS AND SPEAKER SAME AS USED IN—	FOR DIAGRAMS SEE PAGES—	FOR VOLTAGES SEE PAGES—	FOR PARTS LIST SEE PAGES—
228, 228-F	92, 92-F	342 to 345	362 and 363	383, and 367 to 372
228-D	82-D (2nd type)	328 and 329	363	383, 366, and 310 to 319.
228-Q	82-Q (2nd type)	330 and 331	363	383, 366, and 310 to 319
567, 567-F	90, 90-F	340 and 341	362 and 363	383, and 367 to 372

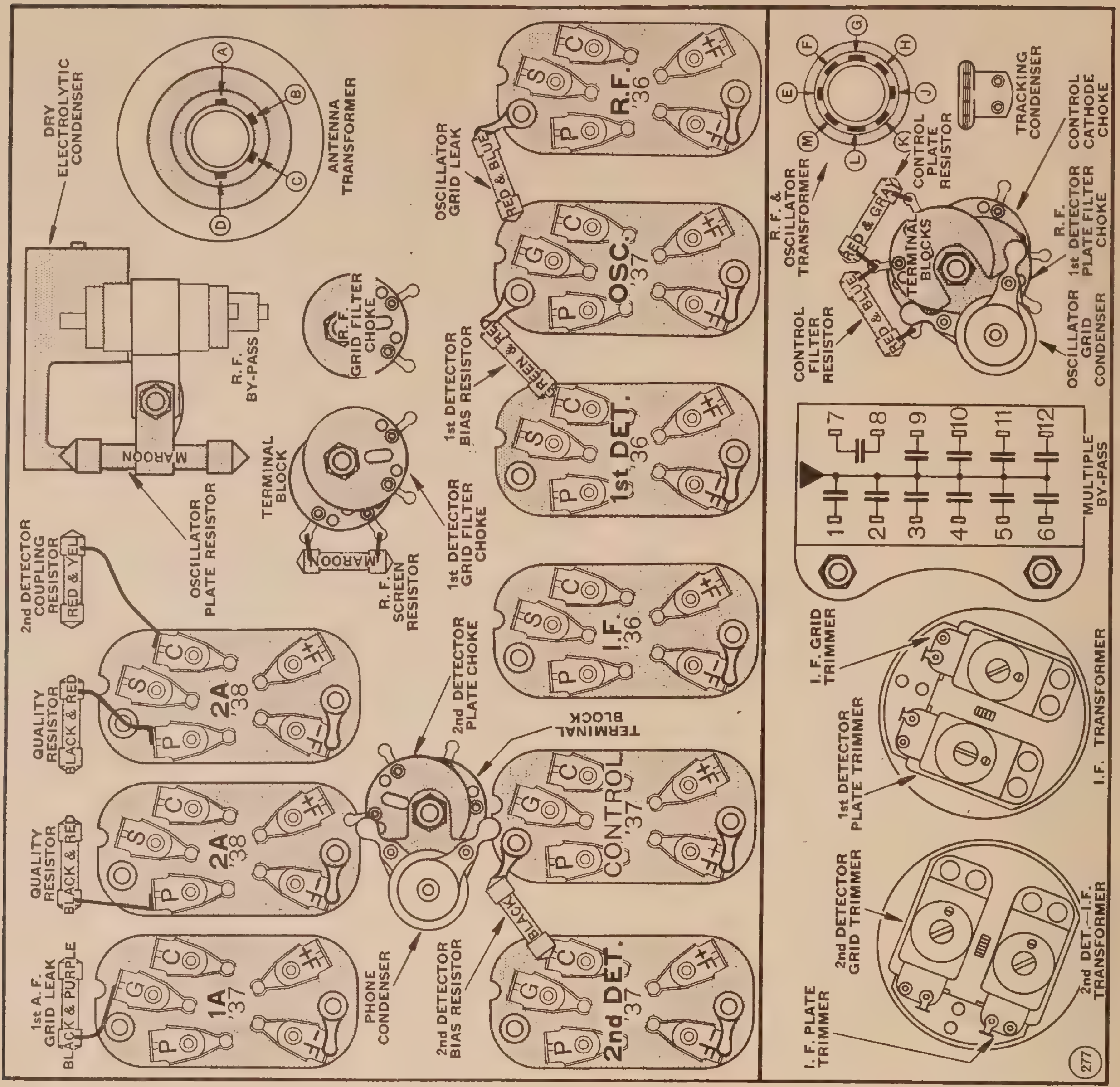
TABULATED DATA FOR MODELS DESCRIBED IN THIS SUPPLEMENT

									TUBES								
Model No.	Power Supply	Part No. Complete	Part No. of Chassis	Part No. of Speaker	Tone-Beam	Automatic Vol. Control	Tone Control	Range Switch	R.F.	1st Det.	I.F.	2nd Det.	1st A.F.	2nd A.F.	Osc.	Control Tube	Rect.
91	Battery	27700	26250-C	27900	No	Yes	No	No	36	36	36	37	37	38 (2)	37	37	—
91-B	Battery	28000	27310-C	27900	No	Yes	No	No	36	36	36	37	37	38 (2)	37	37	—
91-C	Battery	28100	27310-C	27900	No	Yes	No	No	36	36	36	37	37	38 (2)	37	37	—
188	110-V., 60-C.	28400	28400-C	28700	No	Yes	Yes	Yes	58	58	58	57	47	—	56	56	80
188-F	110-V., 25-C.	29300	29300-C	28700	No	Yes	Yes	Yes	58	58	58	57	47	—	56	56	80
228	110-V., 60-C.	28300	28300-C	17300	No	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
228-F	110-V., 25-C.	29200	29200-C	17300	No	Yes	Yes	Yes	35	35	35	24	47	—	27	27	80
228-D	110-V., D. C.	28600	28600-C	18600	No	No	Yes	No	—	36	36	36	37	33	37	—	—
228-Q	Battery	28500	28500-C	18400	No	Yes	Yes	Yes	32	32	32	32	30	33	30	—	—
260	110-V., 60-C.	28900	28900-C	28800	Yes	Yes	Yes	Yes	58	58	58 (2)	56	56	47 (2)	56	*	80
260-F	110-V., 25-C.	29500	29500-C	28800	Yes	Yes	Yes	Yes	58	58	58 (2)	56	56	47 (2)	56	*	80
469	110-V., 60-C.	29000	29000-C	28800	Yes	Yes	Yes	Yes	58	58	58	56	47 (2)	—	56	56	80
469-F	110-V., 25-C.	29400	29400-C	28800	Yes	Yes	Yes	Yes	58	58	58	56	47 (2)	—	56	56	80
567	110-V., 60-C.	28200	28200-C	17300	No	No	Yes	No	35	35	35	24	47	—	27	—	80
567-F	110-V., 25-C.	29100	29100-C	17300	No	No	Yes	No	35	35	35	24	47	—	27	—	80

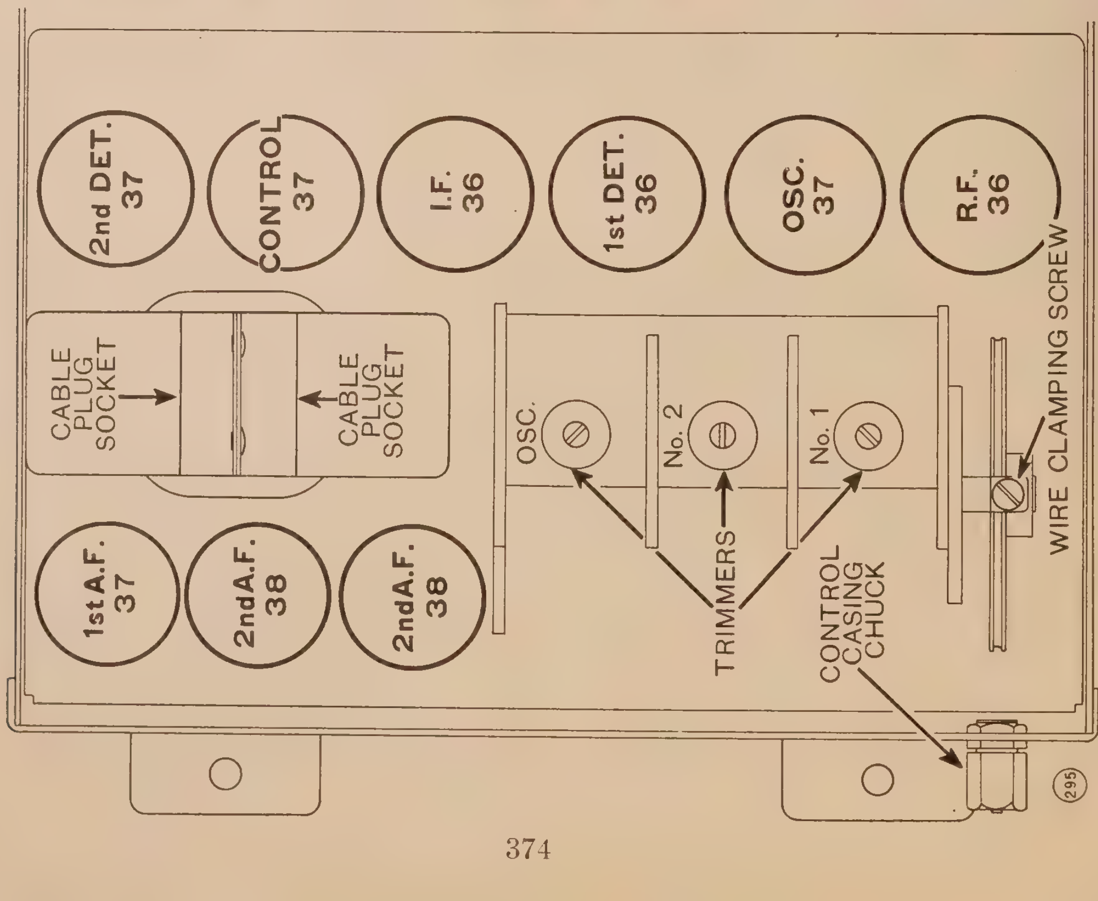
*In Model 260, 260-F, the 2nd-detector tube acts as the automatic volume control tube.

MODEL 91, 91-B, 91-C MOTOR CAR RADIO

(Intermediate Frequency, 260 Kilocycles)


DRY ELECTROLYTIC CONDENSER
ANTENNA TRANSFORMER
A
B
C
D
R. F. BY-PASS
R. F. GRID FILTER CHOKE
MAROON
OSCILLATOR PLATE RESISTOR
TERMINAL BLOCK
R. F. SCREEN RESISTOR
1st DETECTOR GRID FILTER CHOKE
1st DETECTOR BIAS RESISTOR
OSCILLATOR GRID LEAK
RED & BLUE
GREEN & RED
R.F. '36
OSC. '37
1st DET. '36
I.F. '36
CONTROL '37
2nd DET. '37
2A '38
1A '37
S
C
P
G
+F
-F
2nd DETECTOR COUPLING RESISTOR
RED & YEL
QUALITY RESISTOR
BLACK & RED
1st A. F. GRID LEAK
BLACK & PURPLE
PHONE CONDENSER
2nd DETECTOR BIAS RESISTOR
BLACK
2nd DETECTOR PLATE CHOKE
TERMINAL BLOCK
E
F
G
H
J
K
L
M
TRACKING CONDENSER
R. F. & OSCILLATOR TRANSFORMER
CONTROL PLATE RESISTOR
CONTROL CATHODE CHOKE
RED & GRAY
TERMINAL BLOCKS
R. F. 1st DETECTOR PLATE FILTER CHOKE
CONTROL FILTER RESISTOR
OSCILLATOR GRID CONDENSER
1
2
3
4
5
6
7
8
9
10
11
12
MULTIPLE BY-PASS
I. F. GRID TRIMMER
1st DETECTOR PLATE TRIMMER
I. F. TRANSFORMER
2nd DETECTOR GRID TRIMMER
2nd DET.—I.F. TRANSFORMER
I. F. PLATE TRIMMER
277

Bottom Chart of Model 91, 91-B and 91-C.

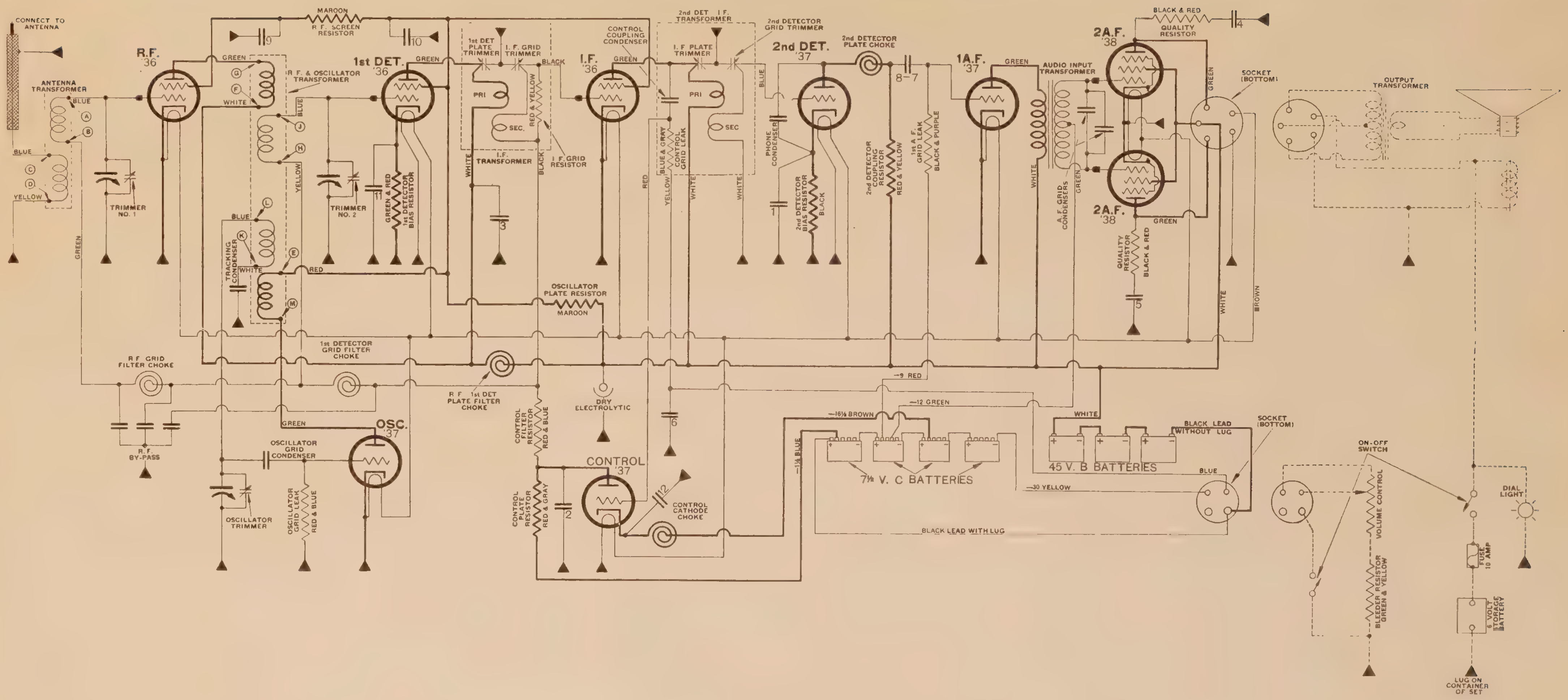

2nd DET. 37
CONTROL 37
I.F. 36
1st DET. 36
OSC. 37
R.F. 36
CABLE PLUG SOCKET
CABLE PLUG SOCKET
OSC.
No. 2
No. 1
TRIMMERS
WIRE CLAMPING SCREW
1st A.F. 37
2nd A.F. 38
2nd A.F. 38
CONTROL CASING CHUCK
295

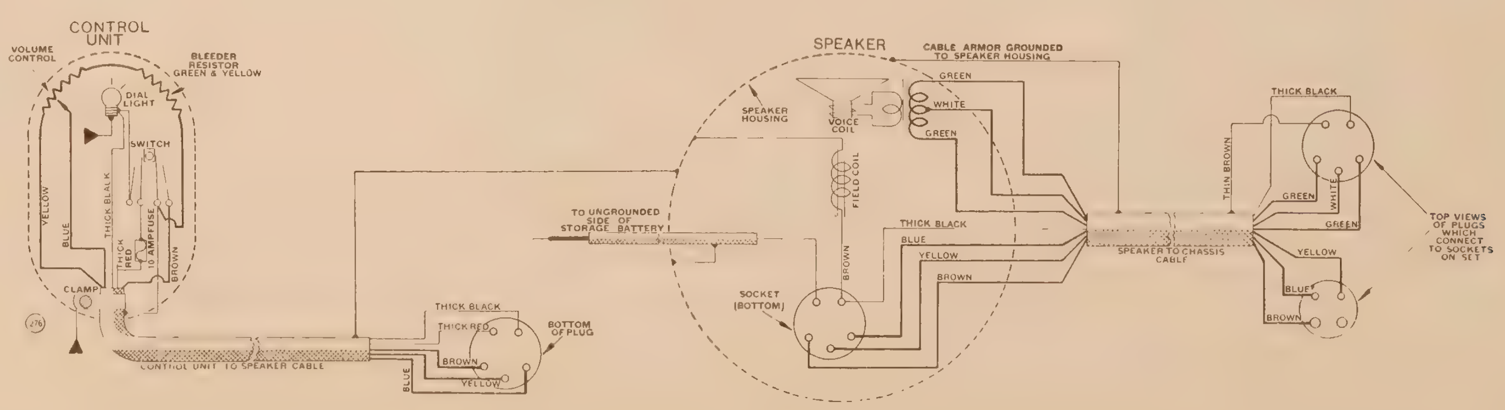
Top View of Model 91, 91-B and 91-C Chassis Showing Location of Tubes.

July 1932.

MODEL 91, 91-B AND 91-C MOTOR CAR RADIO

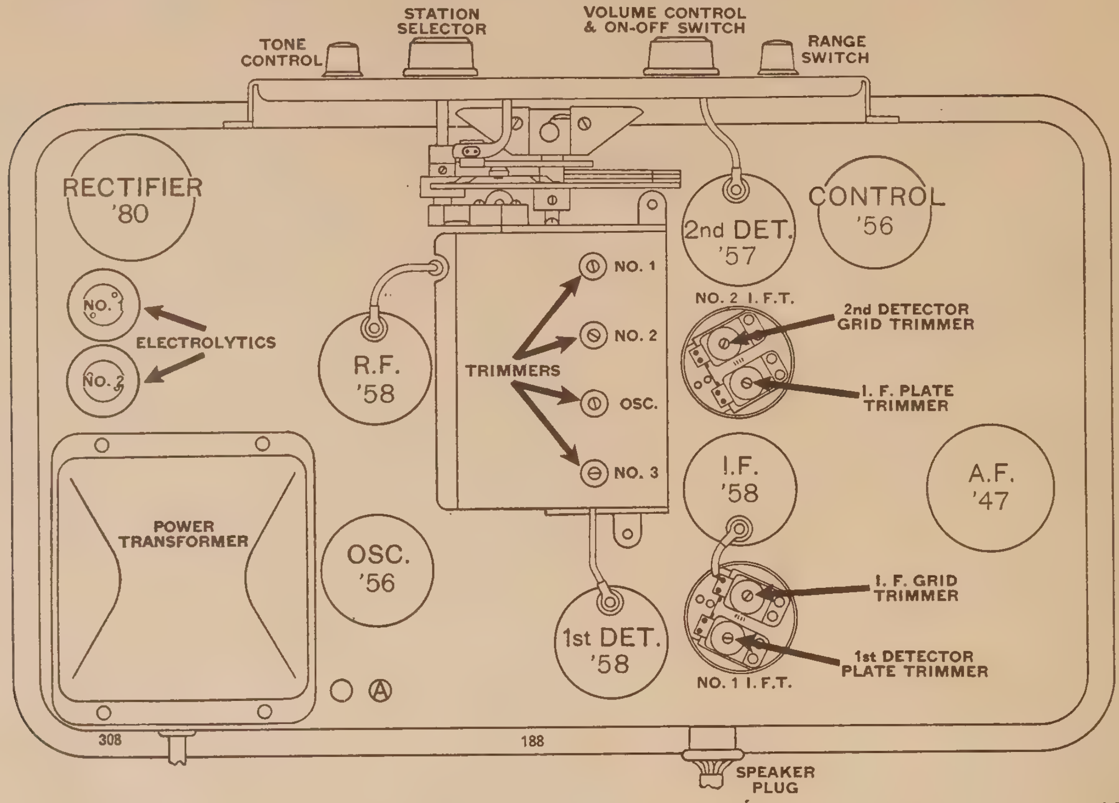
(Intermediate Frequency, 260 Kilocycles)

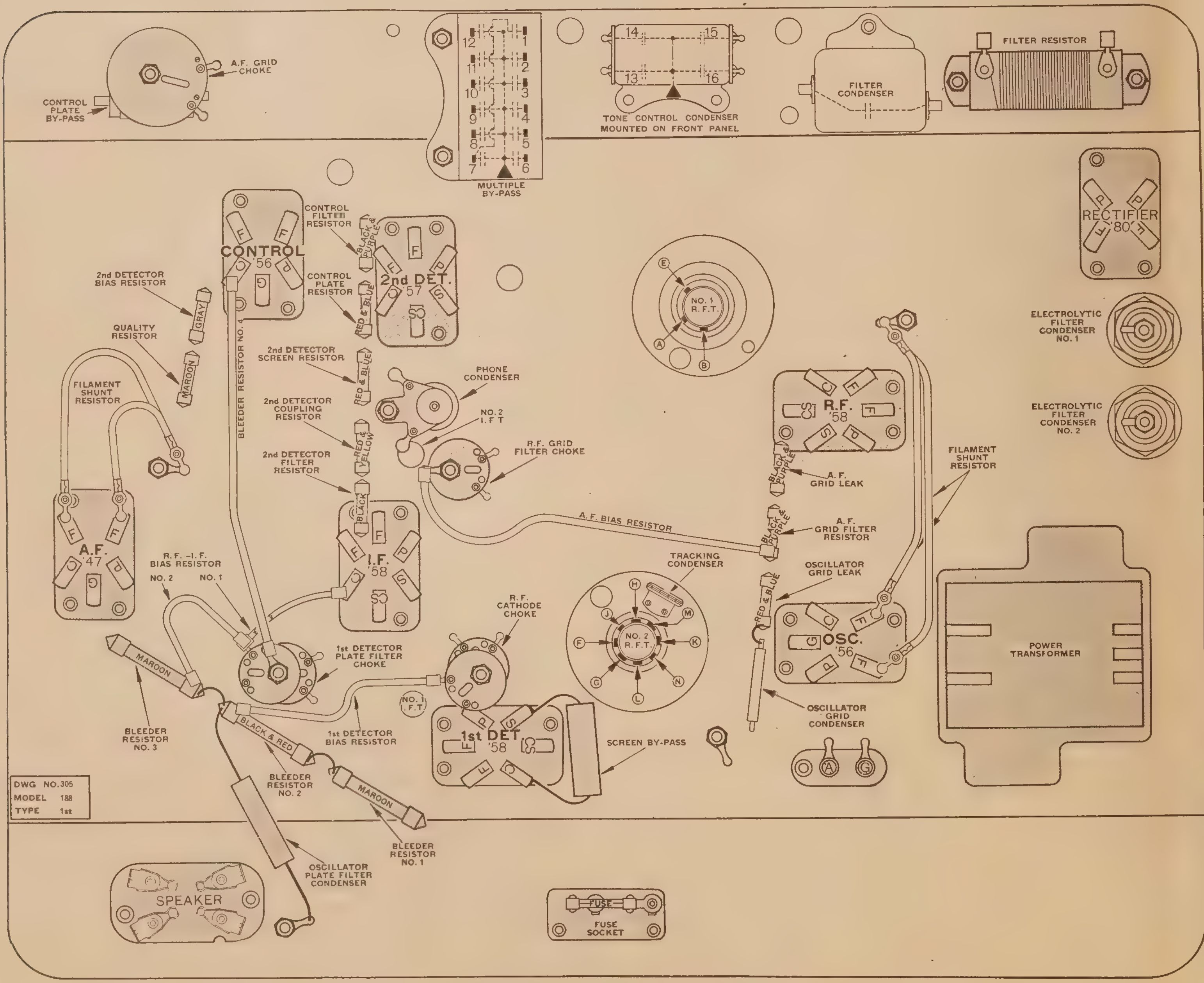

CONNECT TO ANTENNA
ANTENNA TRANSFORMER
BLUE
YELLOW
GREEN
TRIMMER NO. 1
R.F. '36
MAROON
R. F. SCREEN RESISTOR
R. F. & OSCILLATOR TRANSFORMER
WHITE
1st DET. '36
TRIMMER NO. 2
GREEN & RED
1st DETECTOR BIAS RESISTOR
TRACKING CONDENSER
RED
1st DET PLATE TRIMMER
I. F. GRID TRIMMER
PRI
SEC
I.F. TRANSFORMER
BLACK
RED & YELLOW
I. F. GRID RESISTOR
I.F. '36
CONTROL COUPLING CONDENSER
2nd DET I.F. TRANSFORMER
I. F. PLATE TRIMMER
BLUE & GRAY
CONTROL GRID LEAK
2nd DETECTOR GRID TRIMMER
2nd DET. '37
PHONE CONDENSER
2nd DETECTOR BIAS RESISTOR
2nd DETECTOR PLATE CHOKE
2nd DETECTOR COUPLING RESISTOR
1st A. F. GRID LEAK
BLACK & PURPLE
1A.F. '37
AUDIO INPUT TRANSFORMER
A. F. GRID CONDENSERS
2A.F. '38
BLACK & RED
QUALITY RESISTOR
SOCKET (BOTTOM)
OUTPUT TRANSFORMER
BROWN
OSCILLATOR PLATE RESISTOR
1st DETECTOR GRID FILTER CHOKE
R F GRID FILTER CHOKE
R.F. BY-PASS
R F 1st DET PLATE FILTER CHOKE
DRY ELECTROLYTIC
OSC. '37
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK
RED & BLUE
OSCILLATOR TRIMMER
CONTROL FILTER RESISTOR
CONTROL PLATE RESISTOR
RED & GRAY
CONTROL '37
CONTROL CATHODE CHOKE
−9 RED
−12 GREEN
−16½ BROWN
−1½ BLUE
7½ V. C BATTERIES
45 V. B BATTERIES
−30 YELLOW
BLACK LEAD WITHOUT LUG
BLACK LEAD WITH LUG
ON-OFF SWITCH
VOLUME CONTROL
BLEEDER RESISTOR GREEN & YELLOW
DIAL LIGHT
FUSE 10 AMP
6 VOLT STORAGE BATTERY
LUG ON CONTAINER OF SET
A B C D E F G H J K L M
1 2 3 4 5 6 8−7 9 10 11 12


CONTROL UNIT
VOLUME CONTROL
BLEEDER RESISTOR GREEN & YELLOW
DIAL LIGHT
SWITCH
THICK BLACK
THICK RED
10 AMP FUSE
YELLOW
BLUE
BROWN
CLAMP
CONTROL UNIT TO SPEAKER CABLE
THICK BLACK
THICK RED
BROWN
YELLOW
BOTTOM OF PLUG
TO UNGROUNDED SIDE OF STORAGE BATTERY
SPEAKER
SPEAKER HOUSING
VOICE COIL
FIELD COIL
SOCKET (BOTTOM)
CABLE ARMOR GROUNDED TO SPEAKER HOUSING
GREEN
WHITE
THICK BLACK
BLUE
YELLOW
BROWN
SPEAKER TO CHASSIS CABLE
THIN BROWN
TOP VIEWS OF PLUGS WHICH CONNECT TO SOCKETS ON SET

The wiring of the control unit and speaker in Model 91 is the same as in Model 81.

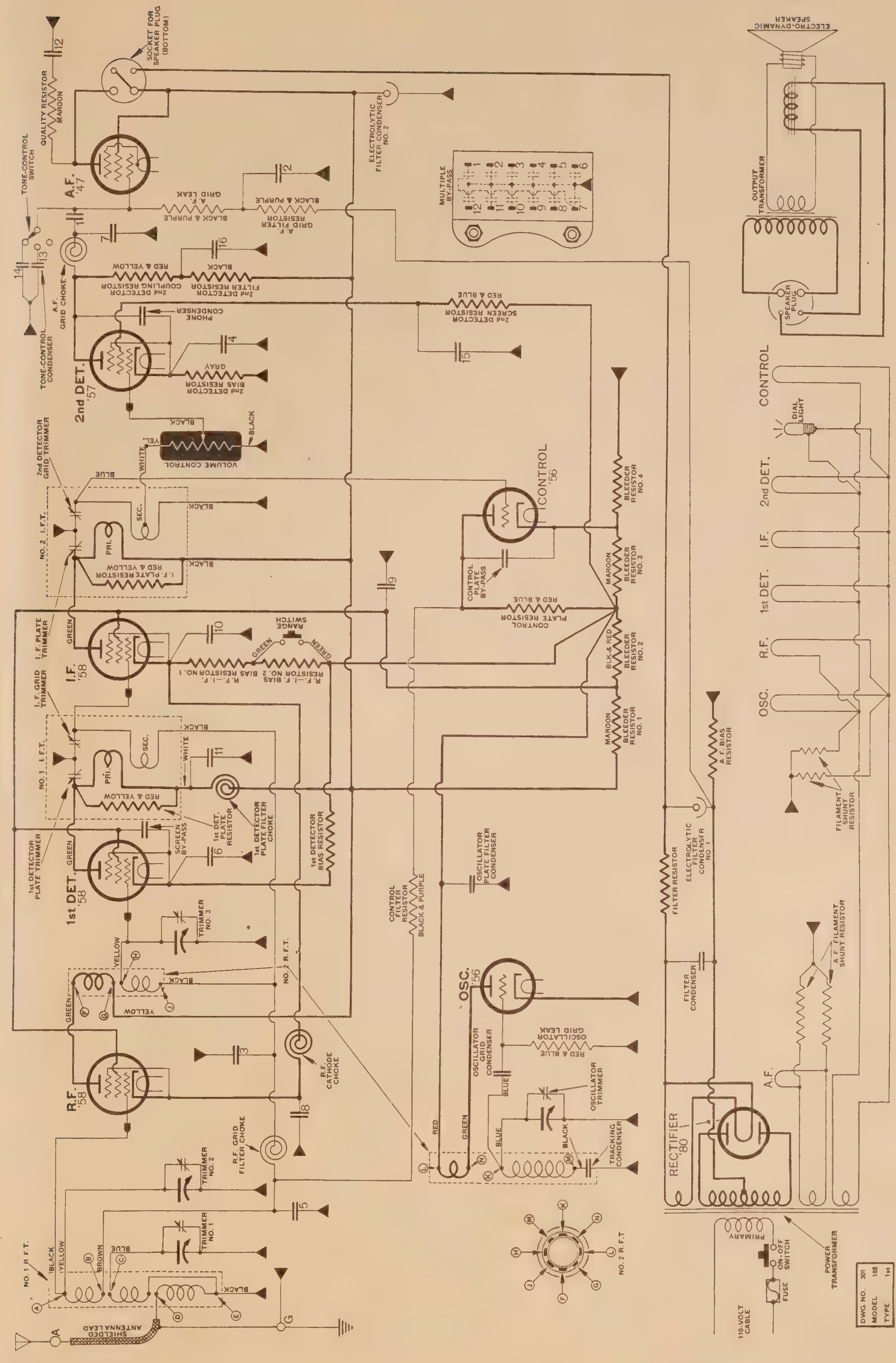
MODEL 188, 188-F TOP VIEW AND CHART


TONE CONTROL
STATION SELECTOR
VOLUME CONTROL & ON-OFF SWITCH
RANGE SWITCH
RECTIFIER '80
NO. 1
NO. 2
ELECTROLYTICS
R.F. '58
TRIMMERS
NO. 1
NO. 2
OSC.
NO. 3
2nd DET. '57
CONTROL '56
NO. 2 I. F. T.
2nd DETECTOR GRID TRIMMER
I. F. PLATE TRIMMER
POWER TRANSFORMER
OSC. '56
I.F. '58
A.F. '47
I. F. GRID TRIMMER
1st DET. '58
1st DETECTOR PLATE TRIMMER
NO. 1 I. F. T.
A
308
188
SPEAKER PLUG


A.F. GRID CHOKE
CONTROL PLATE BY-PASS
12
11
10
9
8
7
1
2
3
4
5
6
MULTIPLE BY-PASS
14
15
13
16
TONE CONTROL CONDENSER MOUNTED ON FRONT PANEL
FILTER CONDENSER
FILTER RESISTOR
CONTROL '56
F
F
C
P
G
CONTROL FILTER RESISTOR
BLACK & PURPLE
CONTROL PLATE RESISTOR
RED & BLUE
2nd DET. '57
F
F
P
C
S
SG
2nd DETECTOR BIAS RESISTOR
GRAY
QUALITY RESISTOR
MAROON
FILAMENT SHUNT RESISTOR
BLEEDER RESISTOR NO. 4
2nd DETECTOR SCREEN RESISTOR
RED & BLUE
PHONE CONDENSER
2nd DETECTOR COUPLING RESISTOR
RED & YELLOW
NO. 2 I. F T
R.F. GRID FILTER CHOKE
2nd DETECTOR FILTER RESISTOR
BLACK
I.F. '58
A.F. '47
R.F. -I. F. BIAS RESISTOR
NO. 2
NO. 1
1st DETECTOR PLATE FILTER CHOKE
R. F. CATHODE CHOKE
NO. 1 I. F. T.
1st DETECTOR BIAS RESISTOR
1st DET. '58
SCREEN BY-PASS
MAROON
BLEEDER RESISTOR NO. 3
BLACK & RED
BLEEDER RESISTOR NO. 2
MAROON
BLEEDER RESISTOR NO. 1
OSCILLATOR PLATE FILTER CONDENSER
DWG NO. 305
MODEL 188
TYPE 1st
SPEAKER
FUSE
FUSE SOCKET
E
NO. 1 R. F. T.
A
B
RECTIFIER '80
ELECTROLYTIC FILTER CONDENSER NO. 1
ELECTROLYTIC FILTER CONDENSER NO. 2
R.F. '58
A.F. GRID LEAK
BLACK & PURPLE
FILAMENT SHUNT RESISTOR
A. F. BIAS RESISTOR
BLACK & PURPLE
A.F. GRID FILTER RESISTOR
TRACKING CONDENSER
H
J
M
F
K
G
N
L
NO. 2 R. F. T.
OSCILLATOR GRID LEAK
RED & BLUE
OSC. '56
OSCILLATOR GRID CONDENSER
A
G
POWER TRANSFORMER

No. 2 R. F. T. includes the oscillator transformer. See note on Page 377.

MODEL 188

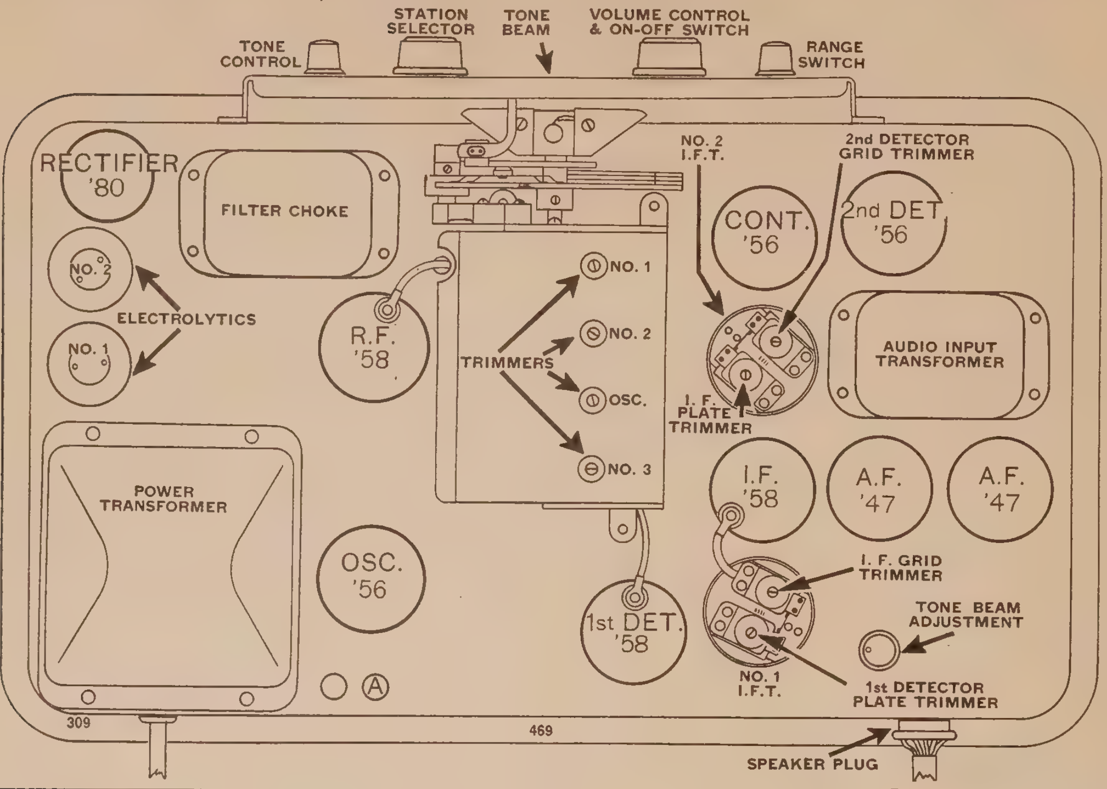

R.F. '58
1st DET. '58
I.F. '58
2nd DET. '57
A.F. '47
OSC. '56
CONTROL '56
RECTIFIER '80
NO. 1 R.F.T.
NO. 2 R.F.T.
NO. 1 I.F.T.
NO. 2 I.F.T.
SHIELDED ANTENNA LEAD
TRIMMER NO. 1
TRIMMER NO. 2
TRIMMER NO. 3
R.F. GRID FILTER CHOKE
R.F. CATHODE CHOKE
1st DETECTOR PLATE TRIMMER
1st DET. PLATE RESISTOR
1st DETECTOR PLATE FILTER CHOKE
1st DETECTOR BIAS RESISTOR
SCREEN BY-PASS
I.F. GRID TRIMMER
I.F. PLATE TRIMMER
I.F. PLATE RESISTOR
R.F.—I.F. BIAS RESISTOR NO. 1
R.F.—I.F. BIAS RESISTOR NO. 2
RANGE SWITCH
2nd DETECTOR GRID TRIMMER
VOLUME CONTROL
2nd DETECTOR BIAS RESISTOR
PHONE CONDENSER
2nd DETECTOR COUPLING RESISTOR
2nd DETECTOR FILTER RESISTOR
2nd DETECTOR SCREEN RESISTOR
A.F. GRID CHOKE
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
QUALITY RESISTOR
SOCKET FOR SPEAKER PLUG (BOTTOM)
A.F. GRID LEAK
A.F. GRID FILTER RESISTOR
ELECTROLYTIC FILTER CONDENSER NO. 2
ELECTROLYTIC FILTER CONDENSER NO. 1
MULTIPLE BY-PASS
CONTROL PLATE BY-PASS
CONTROL PLATE RESISTOR
CONTROL FILTER RESISTOR
BLEEDER RESISTOR NO. 1
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 4
OSCILLATOR PLATE FILTER CONDENSER
OSCILLATOR GRID CONDENSER
OSCILLATOR GRID LEAK
OSCILLATOR TRIMMER
TRACKING CONDENSER
FILTER RESISTOR
FILTER CONDENSER
A.F. BIAS RESISTOR
FILAMENT SHUNT RESISTOR
A.F. FILAMENT SHUNT RESISTOR
OUTPUT TRANSFORMER
ELECTRO-DYNAMIC SPEAKER
SPEAKER PLUG
DIAL LIGHT
OSC.
R.F.
1st DET.
I.F.
2nd DET.
CONTROL
A.F.
POWER TRANSFORMER
PRIMARY
ON-OFF SWITCH
FUSE
110-VOLT CABLE
DWG. NO. 301
MODEL 188
TYPE 1st

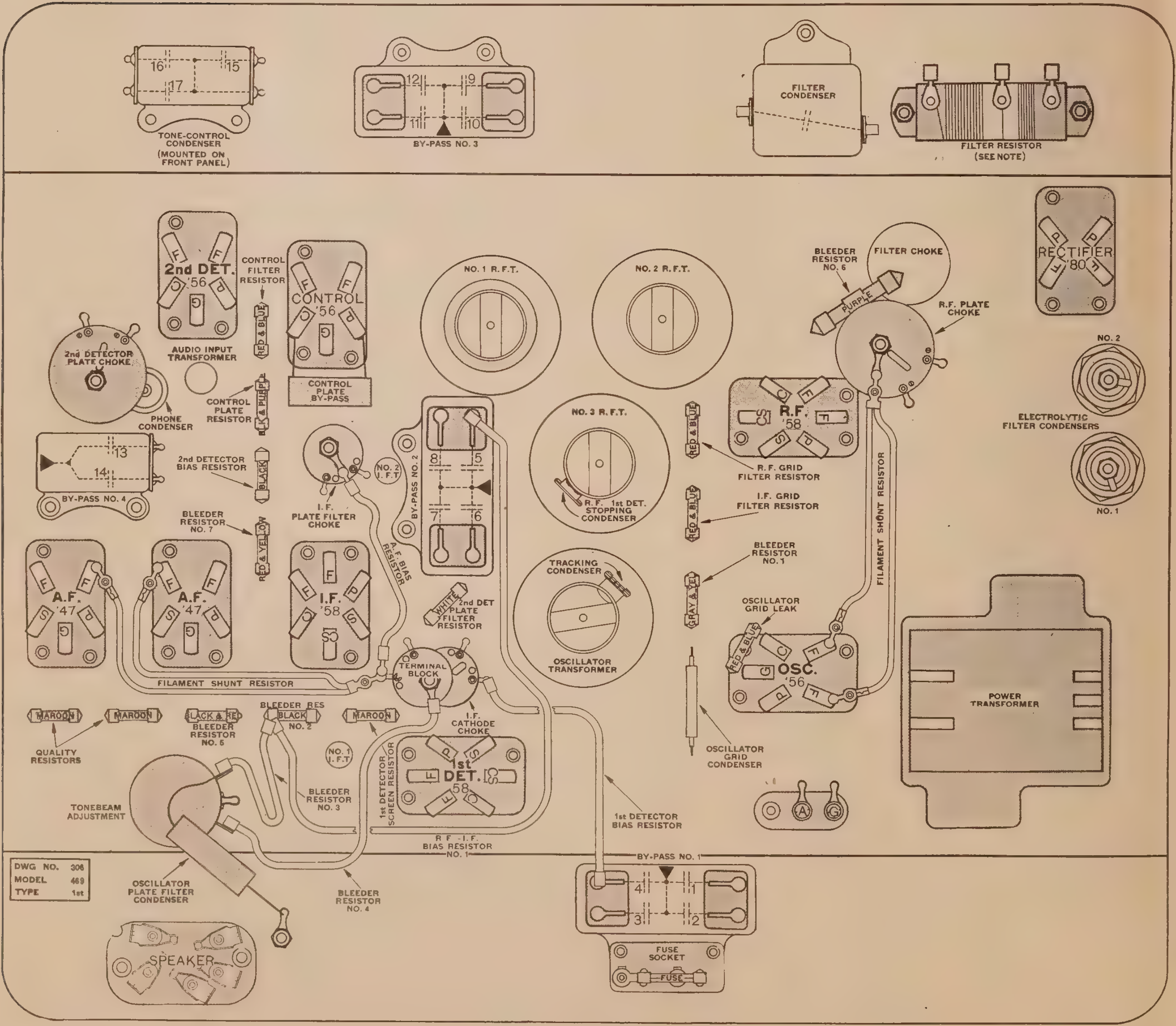
In late-type sets, bleeder No. 2 is black. In late-type Models 188 and 188-F, the oscillator grid winding on No. 2 R. F. T. is split into two separate sections, thus making five coils instead of four on this transformer. Also, a small compensating condenser (No. 16360) is connected across contacts K and M of No. 2 R. F. T.

The late-type No. 23028 R. F. transformer group, which incorporates these changes, supersedes the early-type group. The early-type group is not supplied for service. When installing the late group in place of an early group, it is essential to remove the early-type 1st detector bias resistor No. 21030, and install in its place a late-type 1st detector bias resistor No. 16320. A No. 16320 flexible resistor is provided for this purpose with each No. 23028 R. F. transformer group.

It is also necessary to connect the blue lead from the oscillator grid condenser (125 mmf.) to the extra terminal at the side of No. 2 R. F. T. instead of to terminal K. The extra terminal is the center tap of the oscillator grid coil.

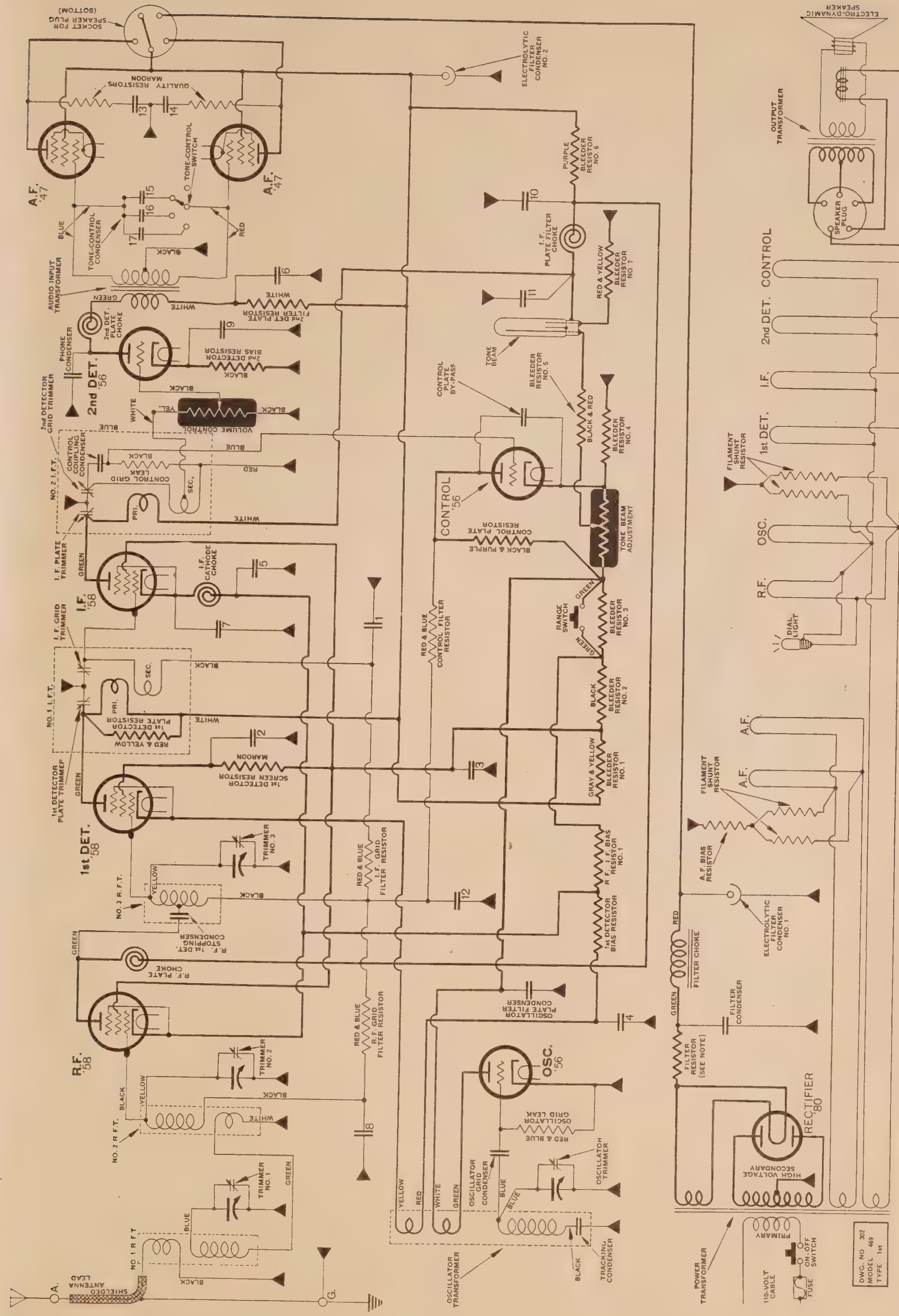
MODEL 469, 469-F TOP VIEW AND CHART


TONE CONTROL
STATION SELECTOR
TONE BEAM
VOLUME CONTROL & ON-OFF SWITCH
RANGE SWITCH
RECTIFIER '80
FILTER CHOKE
NO. 2
NO. 1
ELECTROLYTICS
R.F. '58
TRIMMERS
NO. 1
NO. 2
OSC.
NO. 3
NO. 2 I.F.T.
2nd DETECTOR GRID TRIMMER
CONT. '56
2nd DET. '56
AUDIO INPUT TRANSFORMER
I. F. PLATE TRIMMER
POWER TRANSFORMER
OSC. '56
1st DET. '58
I.F. '58
A.F. '47
A.F. '47
I. F. GRID TRIMMER
TONE BEAM ADJUSTMENT
NO. 1 I.F.T.
1st DETECTOR PLATE TRIMMER
A
309
469
SPEAKER PLUG


16
15
17
TONE-CONTROL CONDENSER (MOUNTED ON FRONT PANEL)
12
9
11
10
BY-PASS NO. 3
FILTER CONDENSER
FILTER RESISTOR (SEE NOTE)
2nd DET. '56
CONTROL FILTER RESISTOR
RED & BLUE
CONTROL '56
AUDIO INPUT TRANSFORMER
2nd DETECTOR PLATE CHOKE
CONTROL PLATE BY-PASS
NO. 1 R.F.T.
NO. 2 R.F.T.
BLEEDER RESISTOR NO. 6
PURPLE
FILTER CHOKE
R.F. PLATE CHOKE
RECTIFIER '80
NO. 2
ELECTROLYTIC FILTER CONDENSERS
NO. 1
PHONE CONDENSER
CONTROL PLATE RESISTOR
BLK & PURPLE
13
14
BY-PASS NO. 4
2nd DETECTOR BIAS RESISTOR
BLACK
BLEEDER RESISTOR NO. 7
RED & YELLOW
I.F. PLATE FILTER CHOKE
NO. 2 I.F.T.
BY-PASS NO. 2
8
5
7
6
A.F. BIAS RESISTOR
NO. 3 R.F.T.
R.F. 1st DET. STOPPING CONDENSER
R.F. '58
R.F. GRID FILTER RESISTOR
I.F. GRID FILTER RESISTOR
BLEEDER RESISTOR NO. 1
GRAY & YEL
FILAMENT SHUNT RESISTOR
A.F. '47
A.F. '47
I.F. '58
WHITE
2nd DET PLATE FILTER RESISTOR
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
OSCILLATOR GRID LEAK
OSC. '56
POWER TRANSFORMER
TERMINAL BLOCK
FILAMENT SHUNT RESISTOR
MAROON
MAROON
BLACK & RED
BLEEDER RES BLACK NO. 2
MAROON
QUALITY RESISTORS
BLEEDER RESISTOR NO. 5
I.F. CATHODE CHOKE
NO. 1 I.F.T.
1st DETECTOR SCREEN RESISTOR
1st DET. '58
BLEEDER RESISTOR NO. 3
OSCILLATOR GRID CONDENSER
1st DETECTOR BIAS RESISTOR
A
G
TONEBEAM ADJUSTMENT
R.F.-I.F. BIAS RESISTOR NO. 1
BY-PASS NO. 1
4
1
3
2
DWG NO. 306
MODEL 469
TYPE 1st
OSCILLATOR PLATE FILTER CONDENSER
BLEEDER RESISTOR NO. 4
SPEAKER
FUSE SOCKET
FUSE

Refer to note under diagram on Page 379.

MODEL 469, 469-F

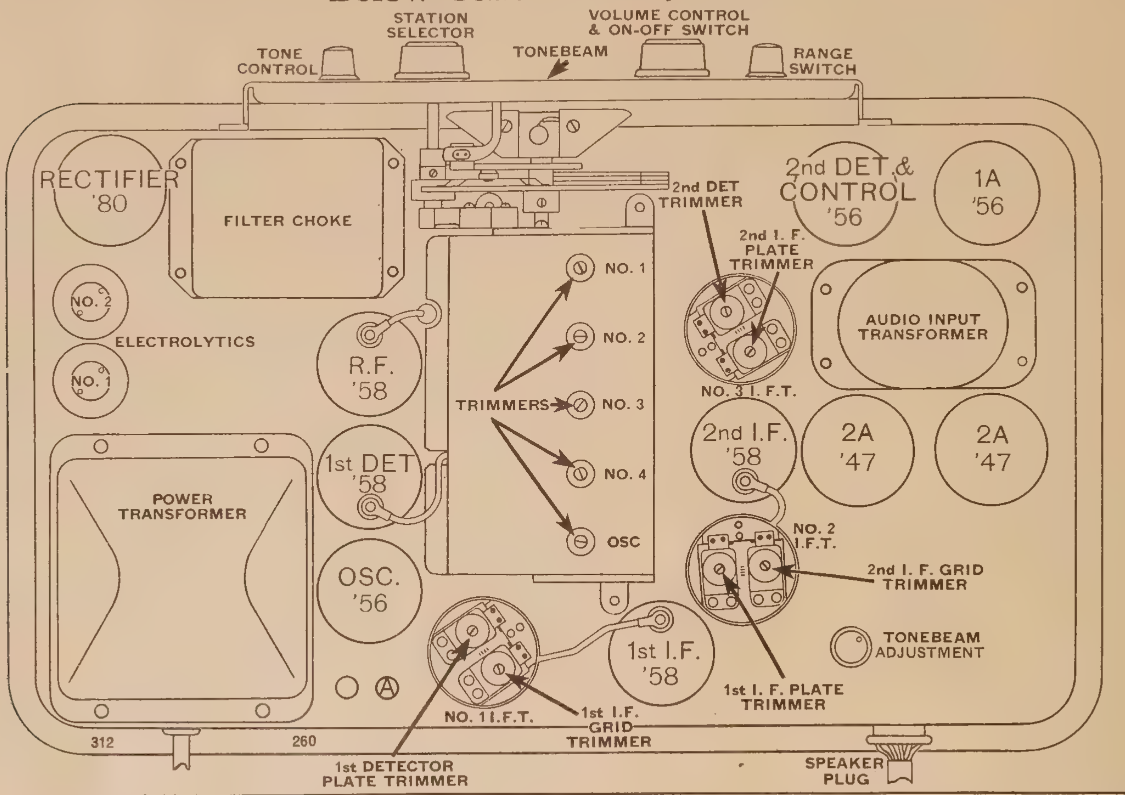

R.F. '58
1st DET. '58
I.F. '58
2nd DET. '56
CONTROL '56
OSC. '56
A.F. '47
A.F. '47
RECTIFIER '80
SOCKET FOR SPEAKER PLUG (BOTTOM)
QUALITY RESISTORS MAROON
TONE-CONTROL SWITCH
TONE-CONTROL CONDENSER
AUDIO INPUT TRANSFORMER
PHONE CONDENSER
2nd DET. PLATE CHOKE
2nd DET PLATE FILTER RESISTOR
2nd DETECTOR BIAS RESISTOR
2nd DETECTOR GRID TRIMMER
VOLUME CONTROL
CONTROL COUPLING CONDENSER
CONTROL GRID LEAK
NO. 2 I.F.T.
I.F. PLATE TRIMMER
I.F. CATHODE CHOKE
I.F. GRID TRIMMER
NO. 1 I.F.T.
1st DETECTOR PLATE RESISTOR
1st DETECTOR PLATE TRIMMER
1st DETECTOR SCREEN RESISTOR
TRIMMER NO. 3
NO. 3 R.F.T.
R.F. 1st DET. STOPPING CONDENSER
R.F. PLATE CHOKE
TRIMMER NO. 2
NO. 2 R.F.T.
TRIMMER NO. 1
NO. 1 R.F.T.
SHIELDED ANTENNA LEAD
A.
G.
R.F. GRID FILTER RESISTOR
I.F. GRID FILTER RESISTOR
CONTROL FILTER RESISTOR
CONTROL PLATE RESISTOR
CONTROL PLATE BY-PASS
TONE BEAM
TONE BEAM ADJUSTMENT
RANGE SWITCH
ELECTROLYTIC FILTER CONDENSER NO. 2
I.F. PLATE FILTER CHOKE
BLEEDER RESISTOR NO. 6
BLEEDER RESISTOR NO. 7
BLEEDER RESISTOR NO. 5
BLEEDER RESISTOR NO. 4
BLEEDER RESISTOR NO. 3
BLEEDER RESISTOR NO. 2
BLEEDER RESISTOR NO. 1
R.F. I.F. BIAS RESISTOR NO. 1
1st DETECTOR BIAS RESISTOR
OSCILLATOR PLATE FILTER CONDENSER
OSCILLATOR GRID LEAK
OSCILLATOR GRID CONDENSER
OSCILLATOR TRIMMER
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
FILTER CHOKE
FILTER CONDENSER
FILTER RESISTOR (SEE NOTE)
ELECTROLYTIC FILTER CONDENSER NO. 1
A.F. BIAS RESISTOR
FILAMENT SHUNT RESISTOR
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
110-VOLT CABLE
FUSE
ON-OFF SWITCH
DIAL LIGHT
R.F.
OSC.
1st DET.
I.F.
2nd DET.
CONTROL
A.F.
A.F.
OUTPUT TRANSFORMER
SPEAKER PLUG
ELECTRO-DYNAMIC SPEAKER
DWG. NO. 302
MODEL 469
TYPE 1st

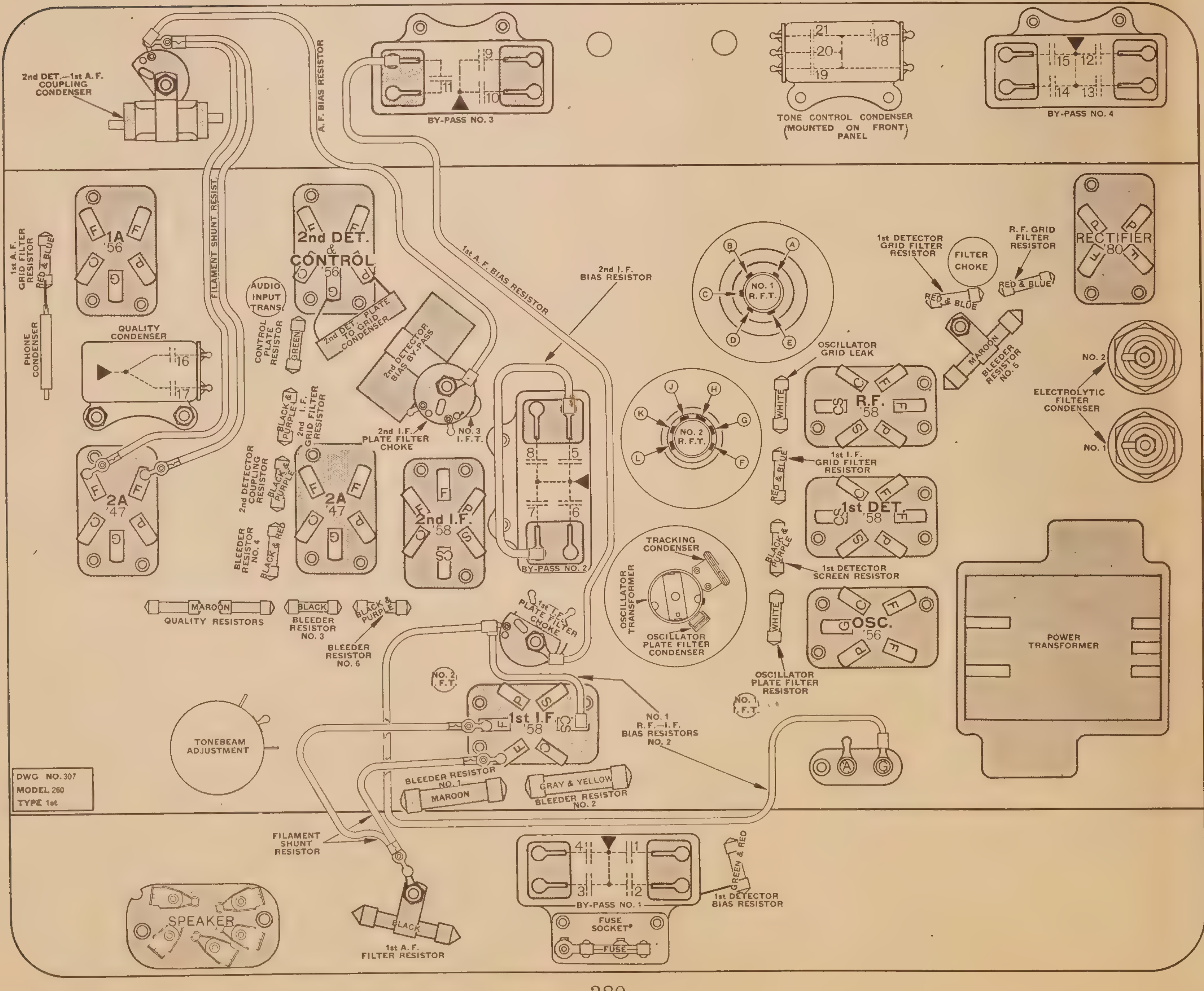
Early-type Model 469 receivers employed a T-12-A power transformer which necessitated the use of a filter resistor (No. 19180-X) as shown above. Later types of this model use a T-23 power transformer which does not require the filter resistor. The T-12-A transformer is not supplied for service, being superseded by the T-23. When installing T-23 in place of a defective T-12-A, it is necessary to remove or short circuit the filter-resistor.

In late-type 469, the 2nd detector filter resistor is sealed inside the audio input transformer, which has six leads: The white lead is for connection to condenser 6, and a yellow lead is for connection to plus B. When replacing an early-type audio input transformer, with the late-type, it is necessary to remove the external 2nd-detector filter resistor.

MODEL 260, 260-F TOP VIEW AND CHART (1st Type)

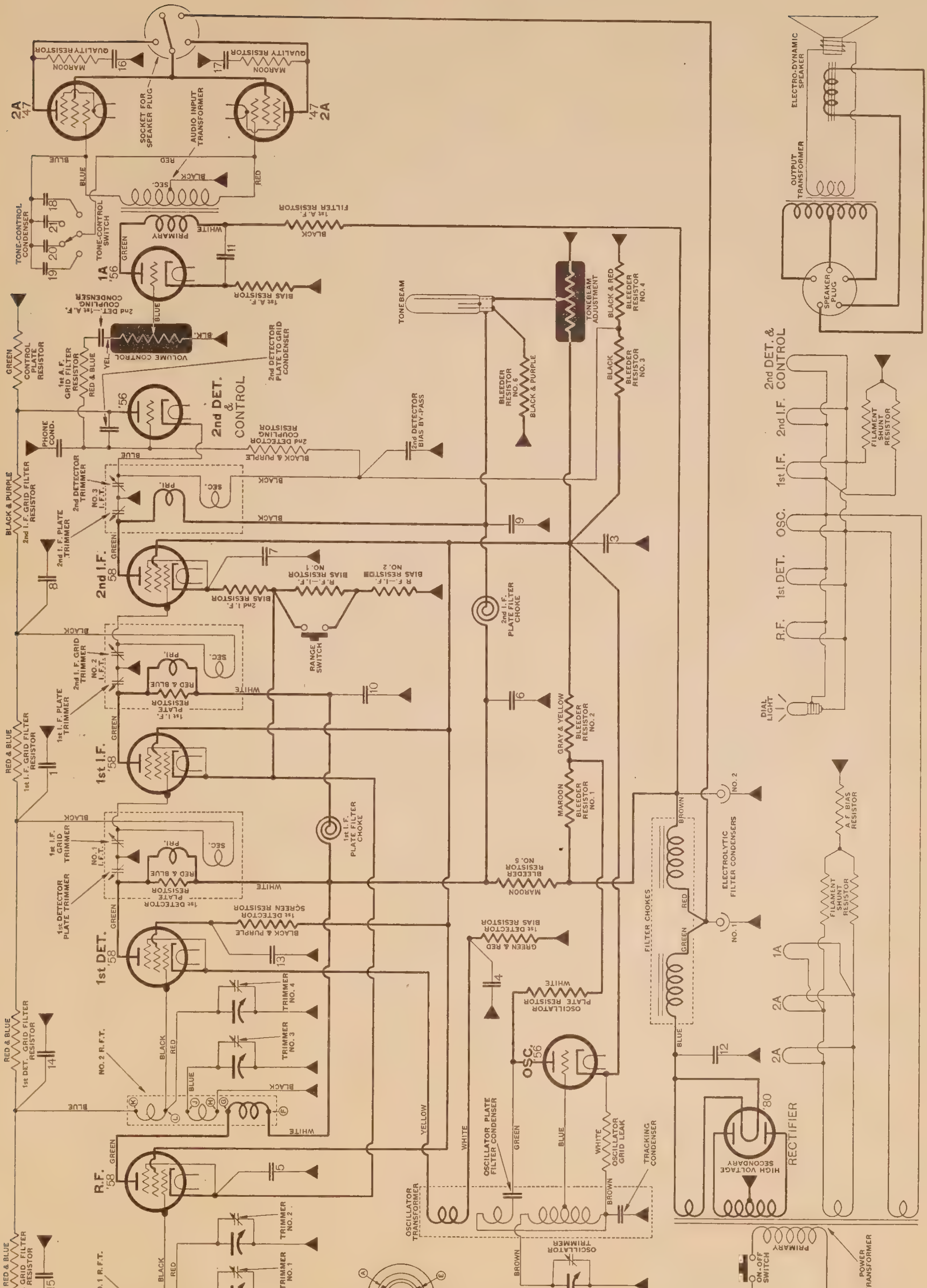
Below Serial No. 8422101


TONE CONTROL
STATION SELECTOR
TONEBEAM
VOLUME CONTROL & ON-OFF SWITCH
RANGE SWITCH
RECTIFIER '80
FILTER CHOKE
2nd DET TRIMMER
2nd DET & CONTROL '56
1A '56
NO. 1
NO. 2
NO. 3
NO. 4
OSC
TRIMMERS
2nd I. F. PLATE TRIMMER
NO. 3 I. F. T.
AUDIO INPUT TRANSFORMER
NO. 2
NO. 1
ELECTROLYTICS
R.F. '58
1st DET '58
OSC. '56
POWER TRANSFORMER
2nd I.F. '58
2A '47
2A '47
NO. 2 I.F.T.
2nd I. F. GRID TRIMMER
TONEBEAM ADJUSTMENT
1st I.F. '58
1st I. F. PLATE TRIMMER
NO. 1 I.F.T.
1st I.F. GRID TRIMMER
1st DETECTOR PLATE TRIMMER
SPEAKER PLUG
A
312
260


2nd DET.—1st A.F. COUPLING CONDENSER
A.F. BIAS RESISTOR
9
11
10
BY-PASS NO. 3
21
20
18
19
TONE CONTROL CONDENSER (MOUNTED ON FRONT PANEL)
15
12
14
13
BY-PASS NO. 4
1st A.F. GRID FILTER RESISTOR
RED & BLUE
1A '56
FILAMENT SHUNT RESIST.
2nd DET. & CONTROL '56
AUDIO INPUT TRANS.
CONTROL PLATE RESISTOR
GREEN
2nd DET. PLATE TO GRID CONDENSER
2nd DETECTOR BIAS BY-PASS
1st A.F. BIAS RESISTOR
2nd I.F. BIAS RESISTOR
A
B
C
D
E
NO. 1 R.F.T.
1st DETECTOR GRID FILTER RESISTOR
FILTER CHOKE
R.F. GRID FILTER RESISTOR
RED & BLUE
RED & BLUE
RECTIFIER '80
PHONE CONDENSER
QUALITY CONDENSER
16
17
BLACK & PURPLE
2nd I.F. GRID FILTER RESISTOR
2nd I.F. PLATE FILTER CHOKE
NO. 3 I.F.T.
OSCILLATOR GRID LEAK
MAROON
BLEEDER RESISTOR NO. 5
NO. 2
ELECTROLYTIC FILTER CONDENSER
NO. 1
WHITE
R.F. '58
J
H
K
G
L
F
NO. 2 R.F.T.
8
5
7
6
BY-PASS NO. 2
2A '47
2nd DETECTOR COUPLING RESISTOR
BLACK & PURPLE
2A '47
BLEEDER RESISTOR NO. 4
BLACK & RED
2nd I.F. '58
1st I.F. GRID FILTER RESISTOR
RED & BLUE
1st DET. '58
BLACK & PURPLE
1st DETECTOR SCREEN RESISTOR
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
OSCILLATOR PLATE FILTER CONDENSER
WHITE
OSC. '56
OSCILLATOR PLATE FILTER RESISTOR
POWER TRANSFORMER
MAROON
QUALITY RESISTORS
BLACK
BLEEDER RESISTOR NO. 3
BLACK & PURPLE
BLEEDER RESISTOR NO. 6
1st I.F. PLATE FILTER CHOKE
NO. 2 I.F.T.
1st I.F. '58
NO. 1 R.F.—I.F. BIAS RESISTORS NO. 2
NO. 1 I.F.T.
A
G
TONEBEAM ADJUSTMENT
DWG NO. 307
MODEL 260
TYPE 1st
BLEEDER RESISTOR NO. 1
MAROON
GRAY & YELLOW
BLEEDER RESISTOR NO. 2
FILAMENT SHUNT RESISTOR
4
1
3
2
BY-PASS NO. 1
GREEN & RED
1st DETECTOR BIAS RESISTOR
FUSE SOCKET
FUSE
SPEAKER
BLACK
1st A.F. FILTER RESISTOR

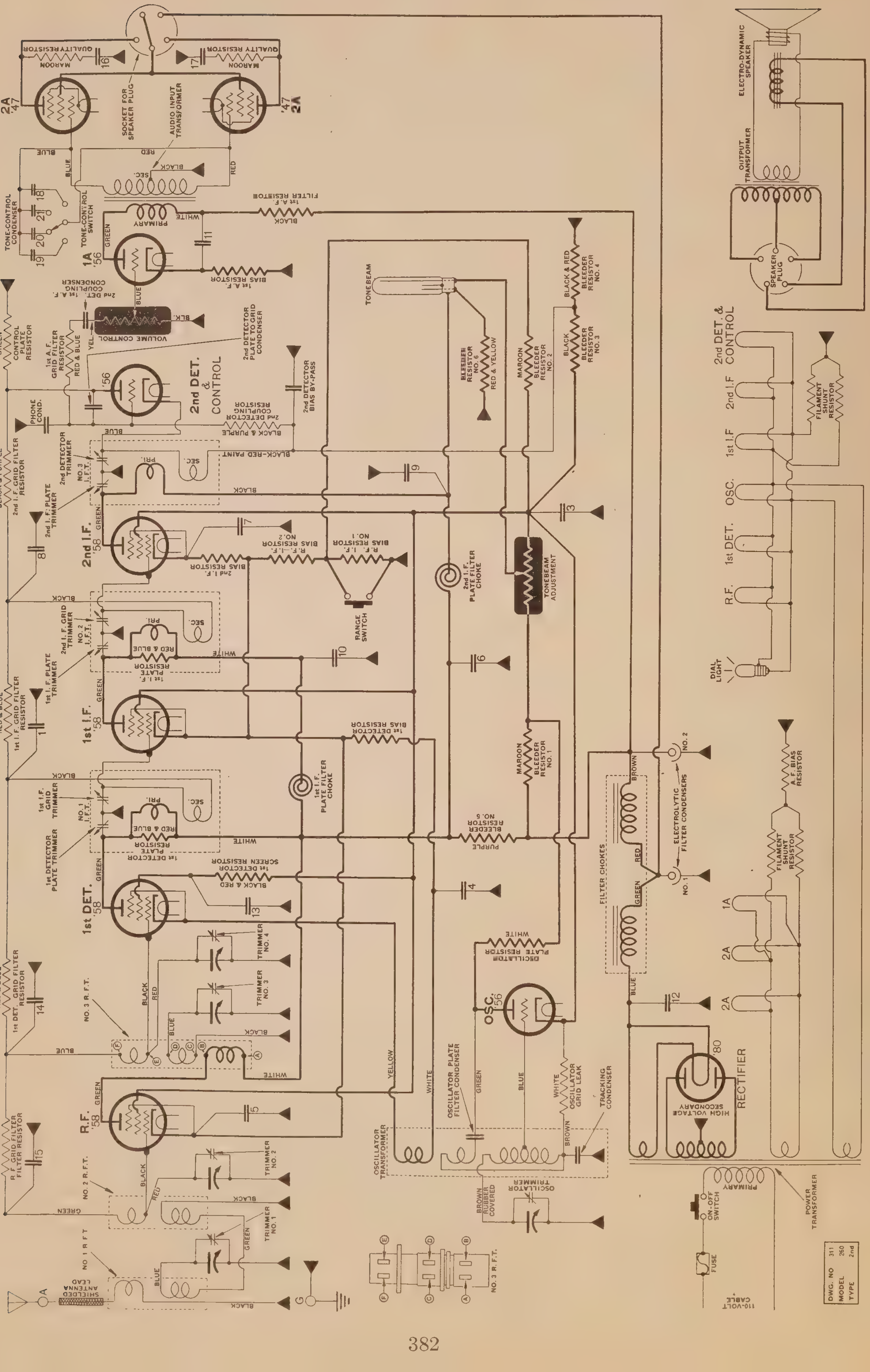
MODEL 260, 260-F (1st Type)

Below Serial No. 8422101

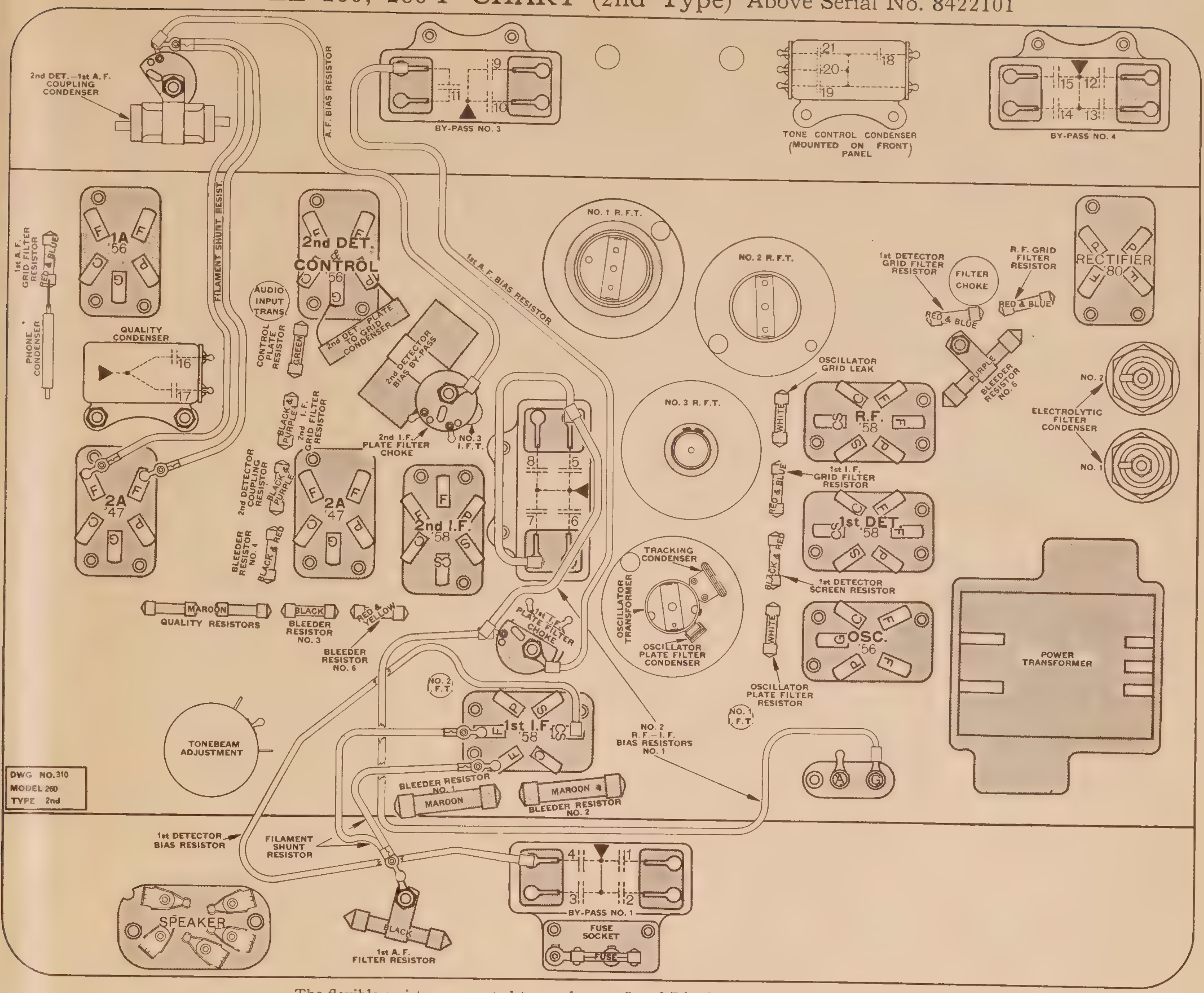

2A '47
MAROON
QUALITY RESISTOR
16
SOCKET FOR SPEAKER PLUG
AUDIO INPUT TRANSFORMER
17
'47 2A
BLUE
RED
BLACK
SEC.
TONE-CONTROL CONDENSER
TONE-CONTROL SWITCH
18
21
20
19
PRIMARY
WHITE
1st A.F. FILTER RESISTOR
BLACK
GREEN
1A '56
11
1st A.F. BIAS RESISTOR
2nd DET.—1st A.F. COUPLING CONDENSER
VOLUME CONTROL
YEL.
BLK.
2nd DETECTOR PLATE TO GRID CONDENSER
GREEN
CONTROL PLATE RESISTOR
1st A.F. GRID FILTER RESISTOR
RED & BLUE
'56
2nd DET. & CONTROL
PHONE COND.
2nd DETECTOR COUPLING RESISTOR
BLACK & PURPLE
2nd DETECTOR BIAS BY-PASS
TONEBEAM
BLEEDER RESISTOR NO. 6
BLACK & PURPLE
TONEBEAM ADJUSTMENT
BLACK & RED
BLEEDER RESISTOR NO. 4
BLACK
BLEEDER RESISTOR NO. 3
BLACK & PURPLE
2nd I.F. GRID FILTER RESISTOR
2nd DETECTOR TRIMMER
NO. 3 I.F.T.
PRI.
SEC.
2nd I.F. PLATE TRIMMER
9
3
8
7
2nd I.F. '58
2nd I.F. BIAS RESISTOR
R.F.—I.F. BIAS RESISTOR NO. 1
R.F.—I.F. BIAS RESISTOR NO. 2
RANGE SWITCH
2nd I.F. PLATE FILTER CHOKE
2nd I.F. GRID TRIMMER
NO. 2 I.F.T.
1st I.F. PLATE TRIMMER
RED & BLUE
1st I.F. PLATE RESISTOR
10
6
RED & BLUE
1st I.F. GRID FILTER RESISTOR
1
1st I.F. '58
1st I.F. PLATE FILTER CHOKE
GRAY & YELLOW
BLEEDER RESISTOR NO. 2
MAROON
BLEEDER RESISTOR NO. 1
1st I.F. GRID TRIMMER
NO. 1 I.F.T.
1st DETECTOR PLATE TRIMMER
1st DETECTOR PLATE RESISTOR
WHITE
BLEEDER RESISTOR NO. 5
1st DETECTOR SCREEN RESISTOR
1st DETECTOR BIAS RESISTOR
GREEN & RED
1st DET. '58
13
4
TRIMMER NO. 4
TRIMMER NO. 3
OSCILLATOR PLATE RESISTOR
OSC. '56
RED & BLUE
1st DET. GRID FILTER RESISTOR
14
NO. 2 R.F.T.
BLUE
BLACK
WHITE
YELLOW
R.F. '58
5
OSCILLATOR PLATE FILTER CONDENSER
OSCILLATOR GRID LEAK
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
OSCILLATOR TRIMMER
BROWN
TRIMMER NO. 2
TRIMMER NO. 1
RED & BLUE
R.F. GRID FILTER RESISTOR
15
NO. 1 R.F.T.
GREEN
SHIELDED ANTENNA LEAD
A
G
NO. 1 R.F.T.
NO. 2 R.F.T.
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
2nd DET. & CONTROL
2nd I.F.
1st I.F.
OSC.
1st DET.
R.F.
FILAMENT SHUNT RESISTOR
DIAL LIGHT
NO. 2
ELECTROLYTIC FILTER CONDENSERS
FILTER CHOKES
BROWN
RED
GREEN
NO. 1
A.F. BIAS RESISTOR
FILAMENT SHUNT RESISTOR
1A
2A
2A
12
80
RECTIFIER
HIGH VOLTAGE SECONDARY
PRIMARY
POWER TRANSFORMER
ON-OFF SWITCH
FUSE
110-VOLT CABLE
DWG. NO. 303
MODEL 260
TYPE 1st

MODEL 260, 260-F (2nd Type)

Above Serial No. 8422101


QUALITY RESISTOR
MAROON
16
2A '47
SOCKET FOR SPEAKER PLUG
AUDIO INPUT TRANSFORMER
17
QUALITY RESISTOR
MAROON
'47 2A
BLUE
RED
BLACK
SEC.
RED
TONE-CONTROL CONDENSER
19
20
21
18
TONE-CONTROL SWITCH
GREEN
PRIMARY
WHITE
11
1st A.F. FILTER RESISTOR
BLACK
1A '56
1st A.F. BIAS RESISTOR
2nd DET. 1st A.F. COUPLING CONDENSER
BLUE
BLK.
VOLUME CONTROL
YEL.
GREEN
CONTROL PLATE RESISTOR
1st A.F. GRID FILTER RESISTOR
RED & BLUE
2nd DETECTOR PLATE TO GRID CONDENSER
'56
2nd DET. & CONTROL
2nd DETECTOR BIAS BY-PASS
PHONE COND.
2nd DETECTOR COUPLING RESISTOR
BLACK & PURPLE
BLUE
2nd DETECTOR TRIMMER
NO. 3 I.F.T.
PRI.
SEC.
BLACK-RED PAINT
BLACK
BLACK & PURPLE
2nd I.F. GRID FILTER RESISTOR
2nd I.F. PLATE TRIMMER
8
GREEN
2nd I.F. '58
7
R.F.-I.F. BIAS RESISTOR NO. 2
R.F. I.F. BIAS RESISTOR NO. 1
2nd I.F. BIAS RESISTOR
RANGE SWITCH
TONE BEAM
BLEEDER RESISTOR NO. 6
RED & YELLOW
MAROON
BLEEDER RESISTOR NO. 2
BLACK
BLEEDER RESISTOR NO. 3
BLACK & RED
BLEEDER RESISTOR NO. 4
9
3
2nd I.F. PLATE FILTER CHOKE
TONEBEAM ADJUSTMENT
BLACK
2nd I.F. GRID TRIMMER
NO. 2 I.F.T.
PRI.
SEC.
RED & BLUE
WHITE
1st I.F. PLATE RESISTOR
10
6
1st I.F. PLATE TRIMMER
RED & BLUE
1st I.F. GRID FILTER RESISTOR
1
GREEN
1st I.F. '58
1st DETECTOR BIAS RESISTOR
1st I.F. PLATE FILTER CHOKE
MAROON
BLEEDER RESISTOR NO. 1
BLACK
1st I.F. GRID TRIMMER
NO. 1 I.F.T.
PRI.
SEC.
RED & BLUE
1st DETECTOR PLATE RESISTOR
WHITE
1st DETECTOR PLATE TRIMMER
BLEEDER RESISTOR NO. 5
PURPLE
1st DETECTOR SCREEN RESISTOR
BLACK & RED
GREEN
1st DET. '58
13
4
TRIMMER NO. 4
TRIMMER NO. 3
RED & BLUE
1st DET. GRID FILTER RESISTOR
14
NO. 3 R.F.T.
BLACK
RED
BLUE
F
E
D
C
B
A
BLACK
BLUE
WHITE
OSCILLATOR PLATE RESISTOR
WHITE
OSC. '56
GREEN
R.F. '58
5
YELLOW
WHITE
GREEN
BLUE
WHITE
OSCILLATOR GRID LEAK
TRACKING CONDENSER
OSCILLATOR PLATE FILTER CONDENSER
OSCILLATOR TRANSFORMER
BROWN
BROWN RUBBER COVERED
OSCILLATOR TRIMMER
RED & BLUE
R.F. GRID FILTER RESISTOR
15
NO. 2 R.F.T.
BLACK
RED
GREEN
BLACK
TRIMMER NO. 2
TRIMMER NO. 1
GREEN
NO. 1 R.F.T.
BLUE
SHIELDED ANTENNA LEAD
A
BLACK
G
E
D
B
F
C
A
NO. 3 R.F.T.
ELECTRO-DYNAMIC SPEAKER
OUTPUT TRANSFORMER
SPEAKER PLUG
2nd DET. & CONTROL
2nd I.F
1st I.F
OSC.
1st DET.
R.F.
DIAL LIGHT
FILAMENT SHUNT RESISTOR
BROWN
NO. 2
ELECTROLYTIC FILTER CONDENSERS
RED
GREEN
NO. 1
FILTER CHOKES
BLUE
12
A.F. BIAS RESISTOR
FILAMENT SHUNT RESISTOR
1A
2A
2A
80
RECTIFIER
HIGH VOLTAGE SECONDARY
PRIMARY
ON-OFF SWITCH
POWER TRANSFORMER
FUSE
110-VOLT CABLE
DWG. NO 311
MODEL 260
TYPE 2nd

MODEL 260, 260-F CHART (2nd Type) Above Serial No. 8422101


2nd DET.—1st A. F. COUPLING CONDENSER
A. F. BIAS RESISTOR
9
11
10
BY-PASS NO. 3
21
20
19
18
TONE CONTROL CONDENSER (MOUNTED ON FRONT PANEL)
15
12
14
13
BY-PASS NO. 4
1st A. F. GRID FILTER RESISTOR
RED & BLUE
PHONE CONDENSER
1A '56
FILAMENT SHUNT RESIST.
2nd DET. & CONTROL '56
AUDIO INPUT TRANS.
CONTROL PLATE RESISTOR
GREEN
2nd DET. PLATE TO GRID CONDENSER
2nd DETECTOR BIAS BY-PASS
1st A. F. BIAS RESISTOR
NO. 1 R. F. T.
NO. 2 R. F. T.
1st DETECTOR GRID FILTER RESISTOR
FILTER CHOKE
R. F. GRID FILTER RESISTOR
RED & BLUE
RED & BLUE
RECTIFIER '80
QUALITY CONDENSER
16
17
BLACK & PURPLE
2nd I. F. GRID FILTER RESISTOR
2nd I. F. PLATE FILTER CHOKE
NO. 3 I. F. T.
PURPLE
BLEEDER RESISTOR NO. 5
OSCILLATOR GRID LEAK
WHITE
R. F. '58
NO. 3 R. F. T.
NO. 2
ELECTROLYTIC FILTER CONDENSER
NO. 1
2A '47
2nd DETECTOR COUPLING RESISTOR
BLACK & PURPLE
BLEEDER RESISTOR NO. 4
BLACK & RED
2A '47
2nd I. F. '58
8
5
7
6
1st I. F. GRID FILTER RESISTOR
RED & BLUE
1st DET. '58
TRACKING CONDENSER
OSCILLATOR TRANSFORMER
OSCILLATOR PLATE FILTER CONDENSER
BLACK & RED
1st DETECTOR SCREEN RESISTOR
WHITE
OSC. '56
MAROON
QUALITY RESISTORS
BLACK
BLEEDER RESISTOR NO. 3
RED & YELLOW
BLEEDER RESISTOR NO. 6
1st I. F. PLATE FILTER CHOKE
POWER TRANSFORMER
OSCILLATOR PLATE FILTER RESISTOR
NO. 2 I. F. T.
NO. 1 I. F. T.
TONEBEAM ADJUSTMENT
1st I. F. '58
NO. 2 R. F.—I. F. BIAS RESISTORS NO. 1
A
G
DWG NO. 310
MODEL 260
TYPE 2nd
BLEEDER RESISTOR NO. 1
MAROON
MAROON
BLEEDER RESISTOR NO. 2
1st DETECTOR BIAS RESISTOR
FILAMENT SHUNT RESISTOR
4
1
3
2
BY-PASS NO. 1
FUSE SOCKET
FUSE
SPEAKER
BLACK
1st A. F. FILTER RESISTOR

The flexible resistor connected to condensers 5 and 7 is the 2nd I. F. bias resistor.

MODEL 228, 228-F

For parts not listed below, see Models 90, 90-F on Pages 367 to 372.

23137	Cabinet, complete	$7.60	22616	Insulating case for electrolytic	$ .10
22991	Escutcheon	.65	22836	Mounting nut for electrolytic	.05
23133	Cloth screen	.75	22791	Case connector soldering lug	.01
22804	Dial knob	.30	22653	I. F. Transformer shield cap	.10
22052	Knob for volume control or tone control	.30	22768	Panel card F-985 net	.01
22538	Electrolytic condenser No. 1 or No. 2	2.50	22820	Instruction card F-989 net	.01

MODEL 228-D, 228-Q

For parts not listed below, see Models 82-D and 82-Q (2nd-type) on pages 366, 310 to 319.

23137	Cabinet, complete	$7.60	22052	Knob for volume control or tone control	$ .30
22991	Escutcheon	.65	22653	I. F. transformer shield cap	.10
23133	Cloth screen	.75	22832	Instruction card F-991 (228-D) net	.01
22804	Dial knob	.30	22831	Instruction card F-990 (228-Q) net	.01

MODEL 567, 567-F

For parts not listed below, see Models 90, 90-F on pages 367 to 372.

23136	Cabinet, complete	$7.60	22616	Insulating case for electrolytic	$ .10
22989	Escutcheon	.65	22836	Mounting nut for electrolytic	.05
23132	Cloth screen	.75	22791	Case connector soldering lug	.01
22804	Dial knob	.30	22654	I. F. Transformer shield cap	.10
22052	Knob for volume control or tone control	.30	22767	Panel card F-984 net	.01
22538	Electrolytic condenser No. 1 or No. 2	2.50	22828	Instruction card F-988 net	.01

No. 28700 SPEAKER USED IN MODEL 188, 188-F

Parts for No. 28700 speaker are the same as used on the No. 24600 speaker listed on Page 318.

No. 28800 SPEAKER USED IN MODEL 260, 260-F, 469, 469-F

Parts for No. 28800 speaker are the same as used on the No. 19800 speaker listed on Page 318.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS LIST, MODEL 91, No. 27700, SUPER-HETERODYNE MOTOR CAR RADIO

Part No.	*Name of Part*	*List Price*
22605	CHASSIS AND BATTERY CONTAINER (Less lid and accessories)	$ 3.00
22712	Gasket rubber, per foot	.05
21049	Container lid	1.00
21148	Battery container cardboard	net .25
21331	Battery top pad	net .03
21061	Mounting bolt 13″ long	.10
21142	Mounting bolt washer	.01
21141	Mounting bolt lockwasher	.70/c
21064	Wing nut	.05
26270	VARIABLE CONDENSER STATOR, ROTOR AND FRAME (with leads)	6.00
4887	Variable condenser mounting screw	.30/c
18844	Rotor connection (long)	.10
20119	Trimmer mica	.03
21126	Control pulley	.75
21583	Control pulley set screw	.05
21479	Control pulley clamp screw	.02
21582	Control pulley clamp washer	.01
21127	Control pulley spring	.55
20928	Spring centering ring	.05

SOCKETS

21041	Tube socket (9 used)	.35
21396	Socket bracket	.35
19547	Self-tapping screw ⅜″ long	.02
21336	Socket (4 prongs)	.30
21337	Socket (5 prongs)	.35
17377	Socket insulator	.25/c
8249	Socket mounting rivet	.50/c
9678	Solder clip	.50/c

TRANSFORMERS

22743	R. F. Transformer group (Includes antenna, R. F. and oscillator transformer)	$ 2.00
22427	Antenna transformer shield	.35
22569	I. F. transformer	2.00
22571	2nd Det. I. F. transformer	2.00
22437	I. F. or 2nd Det. I. F. transformer shield	.50
26280	Audio transformer	4.50

CHOKES

19210	1st Det. grid filter choke	.25
19210	R. F. Grid filter choke	.25
19210	2nd Det. plate choke	.25
19210	R. F. 1st Det. plate filter choke	.25
19210	Control cathode choke	.25

TUBULAR RESISTORS

See Page 388

22472	DRY ELECTROLYTIC CONDENSER	.80
22432	Mounting clamp	.05

FIXED CONDENSERS

25690	Multiple by-pass condenser	2.00
26040	R. F. by-pass condenser	.50
22433	R. F. by-pass condenser clamp	.05
17440	Phone condenser	.50
26050	Tracking condenser	.20
26440	Control coupling condenser	.35
21160	Oscillator grid condenser	.35
24760	DOUBLE I. F. TRIMMER COND.	.95
21838	ANTENNA CABLE	.25
21837	Antenna cable rubber bushing	.05
22027	Antenna cable bushing clamp	.05

No. 27900, SPEAKER USED IN MODEL 91, 91-B, 91-C

21161	DIAPHRAGM assembly	$ 2.25
19469	Diaphragm holding segment	.15
19471	Diaphragm spider washer (fibre)	.30/c
19459	Diaphragm spider washer (hex. metal)	.02
21165	Speaker housing with socket	2.00
21337	Socket (5 prongs)	.35
17377	Socket insulator	.25/c
21053	Grill	1.00
19484	Cone housing	1.75
14842	Cone housing mounting screw	.01
8188	Cone housing mounting nut	.01
19475	Cardboard ring	.10
22440	FIELD COIL	3.00
21508	Field coil insulator	.02
20147	Field coil insulating washer (front)	.05
19479	Field coil insulating washer (back)	.50/c
19454	Top pole plate	.65
19538	Pole plate mounting screw	.03
17433	Pole plate mounting lock washer	.50/c
14367	Pole plate mounting nut	$ .02
22830	OUTPUT TRANSFORMER	3.00
19463	Output transformer strap	.10
21128	SPEAKER-TO-CHASSIS CABLE and plugs, 10′	4.80
22018	Speaker-to-chassis cable bushing clamp (outside)	.05
22019	Speaker-to-chassis cable bushing clamp (inside)	.05
15739	Cable clamp	.02
21132	Cable insulating sleeve	.05
21059	Rubber bushing	.05
21315	Cable clamp	.05
15079	Cable plug (4 prong)	.65
18582	Cable plug (5 prong)	.65
21164	Armored lead to ungrounded side of battery (5 ft. long)	.50
21162	Armored lead clamp	.05
21263	Dash rubber bushing	.10
21062	Speaker mounting bolt	.10
21141	Speaker mounting bolt lockwasher	.70/c
21142	Speaker mounting bolt washer	.01

No. 26460, CONTROL UNIT USED IN MODEL 91, 91-B, 91-C

26460	CONTROL UNIT COMPLETE	$13.75
22742	Control case with nameplate	1.45
22447	Nameplate	.45
21499	Control unit base	1.00
21502	Control case insulation	.10
21495	Control case mounting screw	.02
21503	Steering column clamp	.45
21504	Leather for steering column clamp	.20
21505	Steering column clamp screw	.05
17432	Steering column clamp lock washer	.50/c
21507	Steering column clamp set screw	.05
21324	Steering column cable strap	.05
21579	DIAL STRIP	.25
21494	Dial lamp socket	.25
21407	Dial lamp	.25
21323	Dial knob	.30
21478	Dial knob shaft and gear	.60
21479	Dial knob shaft screw	.02
21481	Dial knob shaft spring washer	.01
21482	Dial gear	.80
21479	Dial gear bearing screw	.02
21483	Dial gear washer	.01
21484	STATION SELECTOR CABLE 9′ 11″ (less sheathing)	.60
21851	Station selector cable sheathing 9′	$ 2.15
21485	Station selector cable clamping plate	.10
21486	Station selector cable clamping screw	.02
21487	Station selector cable chuck complete	.60
21147	Station selector cable staple	.50/c
21488	CONTROL UNIT-TO-SPEAKER CABLE and plug (5′ 2″)	2.40
18582	Plug (5 prong)	.65
21489	Cable clamp	.05
21486	Cable clamp screw	.02
21491	LOCK SWITCH	.75
21585	Lock switch lock washer	.02
21584	Lock switch mounting nut	.10
20976	Switch key	.10
21406	Fuse 10 amp	.15
21493	Fuse socket	.35
21495	Fuse socket mounting screw	.02
21495	Dial lamp socket mounting screw	.02
21496	VOLUME CONTROL	1.10
21325	Volume control knob	.30
21497	Volume control mounting nut	.05
22597	Volume control fibre washer (large)	.05
21586	Volume control fibre washer (small)	.02

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MISCELLANEOUS PARTS FOR MODEL 91, 91-B, 91-C

MISCELLANEOUS PARTS

Part No.	*Name of Part*	*List Price*
21153	Lead to grounded side of battery 36″ long	$ .15
21151	Terminal	.06
23260	Generator condenser	1.25
21144	Distributor suppressor (long)	.60
21143	Plug suppressor (short)	.60
21065	Gasket for chassis and battery container	.30
21068	Antenna lead rubber bushing	.05
22530	Terminal block	.05
19623	Grid lead and cap	.12
22542	Instructions F-979 ....net	.10
22593	Shipping container ....net	.65
23450	PLATE ANTENNA (Complete)	4.00
21557	Antenna plate	3.25

Part No.	*Name of Part*	*List Price*
21559	Antenna plate mounting bolt	$ .10
21558	Porcelain insulator	.12
21561	Wood spacing block	.01
21369	Insulating washer	.03
21562	Iron washer	.01
21141	Lock washer	.70/c
21563	Nut	.02
21442	Instruction sheet ....net	.50/c
23520	IGNITION FILTER (furnished only when defective filter is returned to distributor)	4.25
21624	Condenser for ignition filter No. 23520 (furnished only when defective condenser is returned to distributor)	2.00
23530	Choke for ignition filter	2.00

EXTRA-LENGTH CABLES

Part No.	*Name of Part*	*List Price*
21652	Station selector cable, per foot	$ .06
21654	Speaker-to-chassis cable, per foot	.35
21655	Control unit-to-speaker cable, per foot	.35
21656	Speaker-to-chassis cable (with plugs) 15 ft. long	6.55

Extra-length station-selector-cable sheathing for Model 81 and 91 is furnished only in sections of 10, 15 or 30 feet.

10 feet No. 21653 station-selector-cable sheathing	$ 2.50
15 feet No. 21653 station-selector-cable sheathing	3.75
30 feet No. 21653 station-selector-cable sheathing	7.50

Parts not listed below will be found under Model 91, No. 27700 listed above.

PARTS LIST, MODEL 91-B, No. 28000

22745	Chassis container complete	$ 4.00
22699	Container, less cover and accessories	2.50
21918	Container cover	1.00
21062	Mounting bolt	.10
21824	Mounting nut	$ .02
21823	Thumb screw	.05
23052	Shielded "B" Battery cable 8′ 10″	1.00
23134	Shielded "B" battery cable per ft.	.12
21068	"B" battery cable bushing	.05

PARTS LIST, MODEL 91-C, No. 28100

22746	Chassis container complete	$ 4.00
22541	Container less lid and accessories	2.50
21939	Container lid	.75
22688	Container lid gasket (cork)	.10
21943	Mounting strap 1¾″ x 12″	.10
23052	Shielded "B" battery cable 8′ 10″	1.00
23134	Shielded "B" battery cable per ft.	.12
21068	"B" Battery cable bushing	.05

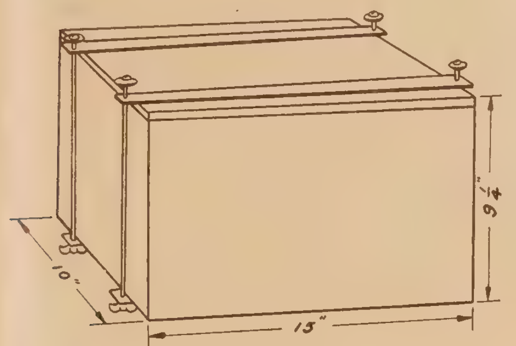
PARTS AND PRICE LIST, MODEL 91-B and 91-C, "B" BATTERY CONTAINERS

LONG TYPE No. 21932

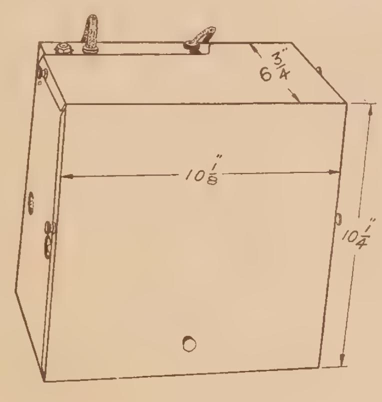
21932	Long "B" battery container, complete	$ 3.50
21928	Container, less lid and accessories	2.50
21924	Container lid	1.00
21068	"B" battery cable bushing	.05

SQUARE TYPE No. 21933

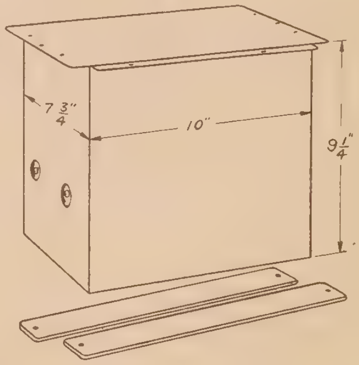
21933	Square "B" battery container, complete	$ 3.50
21906	Container, less lid and accessories	2.50
21909	Container lid	1.00
21068	"B" battery cable bushing	.05



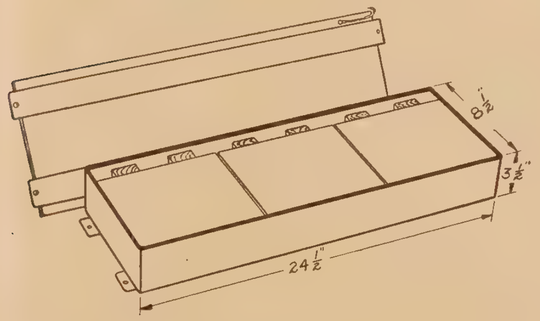
Model 91 Chassis and Battery Container.
(For Under-floor Mounting.)



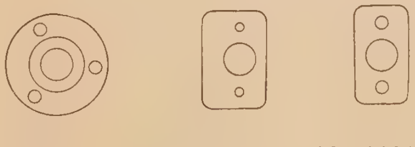
Model 91-B Chassis and "C" Battery Container No. 22745.
(For Dash Mounting.)



Model 91-C Chassis and "C" Battery Container No. 22746.
(May Be Mounted Under Floor or Through Hole Cut in Floor Boards.)

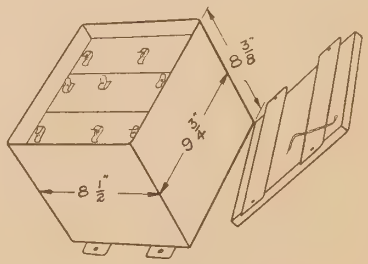


Long Type "B" Battery Container No. 21932.
(For Use with Model 91-B or 91-C.)



No. 22027 No. 22019 No. 22018

Cable Bushing Clamps.
The No. 22018 and 22019 clamps are each made in two sections to permit quick attachment on the cable.



Square Type "B" Battery Container No. 21933.
(For Use with Model 91-B or 91-C.)

THIS LIST SUPERSEDES ALL PREVIOUS LISTS. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST
FOR MODEL 188, 260 AND 469

NAME OF PART	188, 188-F	260, 260-F (1st Type)	469, 469-F
FRONT PANEL, with braces and escutcheon	23029 $2.50	23057 $2.50	23139 $2.50
Left-hand panel brace	22679 .10	22679 .10	22679 .10
Right-hand panel brace	22664 .10	22664 .10	22664 .10
ESCUTCHEON	22758 1.00	22704 1.00	22988 1.00
Escutcheon rivet	8272 .02	8272 .02	8272 .02
DIAL PLATE	22693 .30	22693 .30	22693 .30
Dial-plate rivet	18295 .20/c	18295 .20/c	18295 .20/c
Dial-lamp socket and reflector	26860 .40	26860 .40	26860 .40
Dial lamp (3.2 volts)	19644 .25	19644 .25	19644 .25
Dial knob	22804 .30	22804 .30	22804 .30
VOLUME CONTROL, complete less leads	20389 3.45	20389 3.45	20389 3.45
Volume-control mounting bracket	22643 .20	22643 .20	22643 .20
Volume-control mounting nut	18649 .03	18649 .03	18649 .03
Volume-control knob	17244 .30	17244 .30	17244 .30
TONE-CONTROL condenser	20010 1.00	21530 1.00	27390 1.00
Tone-control switch, complete	20730 .75	24540 .75	24540 .75
Tone-control-switch base	20274 .60	18148 .60	18148 .60
Tone-control-switch shaft and blade	22297 .15	22297 .15	22297 .15
Tone-control-switch shaft key	20096 .30/c	20096 .30/c	20096 .30/c
Tone-control-switch knob	21963 .20	21963 .20	21963 .20
TONEBEAM		22011 2.00	22011 2.00
Tonebeam socket		21959 .70	21959 .70
Tonebeam-socket insulator		21898 .01	21898 .01
Tonebeam-socket mounting strap		21899 .05	21899 .05
Tonebeam clamping spring		22658 .05	22658 .05
Tonebeam shield (fibre)		23033 .01	23033 .01
TONEBEAM ADJUSTMENT potentiometer		26540 1.25	27190 1.25
Potentiometer mounting insulation		22655 .05	22655 .05
Potentiometer knob		22052 .20	22052 .20
Potentiometer label		22926 .01 net	22926 .01 net
POWER TRANSFORMER, 60 cycle	26720 7.50	26920 8.25	26930 8.25
Power transformer, 25 cycle	27430 9.50	27440 10.75	27450 10.75
Power-transformer cover, 60 cycle	22748 .50	22748 .50	22748 .50
Power-transformer cover spring	22676 .05	22676 .05	22676 .05
Power-transformer cover, 25 cycle	23073 $ .50	23073 $ .50	23073 $ .50
AUDIO INPUT TRANSFORMER		26940 3.75	26950 3.75
R. F. TRANSFORMER GROUP	23028 2.00	23058* 2.00	23059 3.00
R. F. transformer shield	22678 .15	22678 .15	22678 .15
Base for R. F. or osc. trans. shield	22677 .10	22677 .10	22677 .10
OSCILLATOR TRANSFORMER		27080 1.25	27040 1.25
Oscillator-transformer shield		22678 .15	22678 .15
No. 1 I. F. TRANSFORMER, less trimmers	22771 2.00	22913 2.00	22771 2.00
No. 2 I. F. transformer, less trimmers	22772 2.00	22913 2.00	22917 2.00
No. 3 I. F. transformer, less trimmers		22915 2.00	
I. F. transformer shield	21877 .30	21877 .30	21877 .30
I. F. T. shield cap, with hole	22654 .10	22654 .10	22654 .10
I. F. T. shield cap, without hole	22653 .10	22653 .10	22653 .10
I. F. T. shield insulator	23172 .05	23172 .05	23172 .05
FILTER-CHOKE UNIT		26960 5.75	26970 5.75
Filter-choke cover or lid		17302 .20	
R. F. plate choke			17015 .50
R. F. grid filter or cathode choke	19210 .25		
1st-detector plate filter choke	19210 .25		
I. F. plate filter or cathode choke		19210 .25	19210 .25
2nd-detector plate or A. F. grid choke	17390 .60		17390 .60
FILTER CONDENSER UNIT, paper and foil type	26620 1.00		26620 1.00
Filter condenser No. 1 or 2 (electrolytic)	22538 2.50	22538 2.50	22538 2.50
Mounting nut	22836 .05	22836 .05	22836 .05
Mounting lockwasher	22863 .03	22863 .03	22863 .03
Insulating bushing	22775 .50/c		
Insulating washer	22774 .02		
Case connector soldering lug	22791 .01		
SMALL FIXED CONDENSERS			
Control coupling condenser			16360 .10
Control-plate by-pass condenser	23250 .35		26820 .20
Control-plate by-pass condenser clamp	22057 .05		
Oscillator grid condenser	26670 .25		26670 .25
Oscillator plate filter condenser	26820 .20		26820 .20

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*In 2nd-type Model 260, after serial No. 8422101, the R. F. transformer group is No. 23154, list price $3.00.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PARTS AND PRICE LIST (Continued)

FOR MODEL 188, 260 AND 469

NAME OF PART	188, 188-F	260, 260-F (1st Type)	469, 469-F
Tracking condenser	26690 $ .25	26690 $ .25	26690 $ .25
Phone condenser	17440 .50	26670 .25	17440 .50
Screen by-pass	26660 .25		
2nd-detector bias by-pass cond.		26550 .50	
Clamp for above		22684 .05	
2nd-detector—1st-A. F. coupling cond.		23250 .35	
Clamp for above		22057 .05	
2nd-detector plate-to-grid condenser		26820 .20	
DOUBLE I. F. TRIMMER CONDENSER	24760 .95	24760 .95	24760 .95
BY-PASS CONDENSER, MULTIPLE TYPE (Other by-pass condensers are listed on page 388)	24250 2.00		
VARIABLE CONDENSER rotor, stator and frame	23031 6.00	23056 7.50	23031 6.00
Variable-condenser cover	22708 .35	22707 .45	22708 .35
Rotor connection	20235 .10	20235 .10	20235 .10
Dial-knob shaft	22692 .05	22692 .05	22692 .05
Dial-knob-shaft bracket	22578 .35	22578 .35	22578 .35
Dial rubber and bushing	22657 .15	22657 .15	22657 .15
Dial pointer	22645 .05	22645 .05	22645 .05
Dial-pointer shim	18823 .02	18823 .02	18823 .02
Dial gear and balance weight	22697 .75	22697 .75	22697 .75
Pointer-control arm	22717 .30	22717 .30	22717 .30
Trimmer mica	20119 .03	20119 .03	20119 .03
Trimmer sealing wax	.50/lb.		
FLEXIBLE AND WIRE-WOUND RESISTORS (For tubular resistors, see page 388)			
R. F.—I. F. bias resistor No. 1	20040 .20	17380 .20	20040 .20
R. F.—I. F. bias resistor No. 2	21030 .20	25950 .20	
1st-detector bias resistor	16320 .20	**	16320 .20
2nd-I. F. bias resistor		20040 .20	
1st-A. F. bias resistor		21030 .20	
A. F. bias resistor	25840 .20		25840 .20
2nd-A. F. bias resistor		21420 .20	
Bleeder resistor No. 3			20520 .20
Bleeder resistor No. 4	20380 .20		20380 .20
Filter resistor	19180 1.00		

NAME OF PART	188, 188-F	260, 260-F (1st Type)	469, 469-F
Filament shunt resistor	17077 $ .15	17077 $ .15	17077 $ .15
SOCKET for Type '47 and '56	22734 .20	22734 .20	22734 .20
Socket for Type '57 and '58	22733 .20	22733 .20	22733 .20
Rectifier socket*	22689 .30	22689 .30	22689 .30
Speaker socket	21336 .30	21337 .35	21337 .35
Speaker-socket insulator	22669 .02	22671 .02	22671 .02
Socket eyelet	8249 .50/c	8249 .50/c	8249 .50/c
Fuse socket	18449 .15	18449 .15	18449 .15
Fuse-socket insulator	22723 .25/c	22723 .25/c	22723 .25/c
TUBE SHIELD	22683 .15	22683 .15	22683 .15
Tube-shield base	22681 .03	22681 .03	22681 .03
110-VOLT DOUBLE CONDUCTOR CABLE AND PLUG	19566 1.90	19566 1.90	19566 1.90
110-volt plug (male)	18897 .15	18897 .15	18897 .15
110-volt cable bushing	16741 .05	16741 .05	16741 .05
Bushing retaining spring	16742 .05	16742 .05	16742 .05
BINDING-POST BASE	18363 .05	18363 .05	18363 .05
Binding post, marked A	19536 .20	19536 .20	19536 .20
Binding post, plain	8215 .20	8215 .20	8215 .20
RANGE SWITCH	17242 1.00	17242 1.00	17242 1.00
Range-switch knob	21963 .20	21963 .20	21963 .20
MISCELLANEOUS PARTS			
Cloth Screen	23286 1.00	23287 1.00	23287 1.00
Line fuse (2 amps)	18534 .05	18534 .05	18534 .05
Control-grid lead and cap	19623 .12	19623 .12	19623 .12
Shielded antenna lead	22614 .15	22614 .15	22614 .15
Double terminal block	22530 .05	22530 .05	22530 .05
Rubber pad ($\frac{11}{16}$" by ¾")	22095 .01	22095 .01	22905 .01
Bottom plate	22865 1.30	22865 1.30	22865 1.30
Ground clamp assembly	13989 .30	13989 .30	13989 .30
Instruction and log card	22833 F-992 .01 net		
Instruction folder		22615 F-1008 .01 net	22615 F-1008 .01 net
Panel card	22769 F-986 .01 net	22738 F-993 .01 net	22875 F-994 .01 net
Shipping container	22789 .65 net	22905 .65 net	22906 .65 net

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*Early Models use a No. 22735 rectifier socket which is of similar design to the new sockets for the 58 tubes. No. 22735 and No. 22689 are of different size and are not interchangeable.

**In 2nd-type Model 260, the first detector bias resistor is No. 20120, list price $0.20.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

TUBULAR RESISTORS

EXTRA LARGE SIZE

27210	Maroon	$ .30
27220	Gray-yellow	.30

LARGE SIZE, 1¾ INCHES LONG

(Large Size, 1¾ inches—*Continued*)

15285	Gray	.50
15544	Yellow	.25
15545	Maroon	.25
15592	Black	.25
15891	Black-red	.25
15892	Green	.25
16282	Blue-red	.25
16724	White	.25
19346	Green-red	$ .30
19581	Red-yellow	.25
19649	Black-purple	.25
20151	Purple	.25
20223	Red-gray	.25
21784	Gray-green (Superseded by 22211)	.25
22211	Yellow-gray	.25
22407	Black-yellow-red	.25

SMALL SIZE, 1 INCH LONG

20920	Red-yellow	$ .25
20930	Black-purple	.25
20940	Green	.25
20950	Maroon	.25
20960	Gray-yellow	.25
20970	Gray	.25
20980	Red-blue	.25
21040	Black	.25
21050	Blue-gray	.25
23120	Red-black	.25
23130	Red-gray	.25
23170	Green-yellow	.25
26160	White	.25
26410	Green-red	.25

When replacing a tubular resistor, use a resistor of the same identifying color and size.

BY-PASS AND TONE-CONTROL CONDENSERS

Part No.	**Code Markings*	*List Price*
15262	B-1, H-1, H-9, H-20	$1.00
15263	B-2, H-2	.90
15640	H-16	1.00
15770	H-15	1.00
15780	H-17	1.10
15790	H-18, H-21	1.00
15837	B-3 (Superseded by 16233)	
15870	B-7, L-28	1.00
16060	H-24, L-29 (304) (Superseded by 18350)	***
16233	H-4, H-10	.90
16461	H-6, H-12	.75
16462	H-5, H-11	1.00
16490	B-6, L-12	1.00
16745	H-7, H-8, H-13	1.00
16828	B-5	.50
16880	H-23, L-26 (439)	1.10
16940	H-22, L-10	$1.10
17360	H-27, L-32	1.10
17370	H-25, H-26, L-3, L-39	1.10
18350	H-28, L-49	1.10
19150	H-29	1.00
19160	H-30	1.00
19560	H-31	1.00
19690	H-32	1.00
19710	H-33	1.00
19980	H-34	1.00
19990	H-35	1.00
20010	B-8	1.00
20350	H-36	1.00
20830	L-B-9, J-2, J-1	2.00
21170	H-37	1.00
21180	H-38	1.00
21250	B-9	1.00
21430	H-39, L-37-A	$1.00
21440	H-40, L-44-A	1.00
21450	B-10, L-36-A	.50
21530	L-42-A, B-11	1.00
22050	H-41	1.00
22570	J-3	2.00
23140	J-4	2.00
23310	H-42 (Superseded by 21180)	**
23330	H-43	1.00
23590	L-55-A, H-44	1.00
23610	L-57-A, H-45	1.00
24250	LB-30, J-5	2.00
25690	LB-34, J-6	2.00
27120	H-46, L-66-A	1.00
27140	H-47	1.00
27390	B-14	1.00

*For information about code markings, see Page 253. **Do not use 23310 in place of 21180. ***See note on Page 243.

VOLTAGE TABLE

91, 91-B, 91-C, 188, 188-F, 260, 260-F, 469, 469-F

The voltages listed in this table are only approximate and are measured values, not actual operating values.

Use 250-volt scale of a 1000-ohm-per-volt voltmeter.

TONEBEAM ADJUSTMENT FULL COUNTER CLOCKWISE; RANGE SWITCH AT LOCAL.

All plates, screen and grid measurements are made from cathode in heater-type tubes, and from —F in plain-filament-type tubes.

LINE VOLTAGE = 110 VOLTS

TUBE	CIRCUIT	91 91-B 91-C	188 188-F	260 260-F 1ST TYPE	260 260-F 2ND TYPE	469 469-F
R. F. TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	130	130	200	250	125
	SCREEN	80	75	90	70	110
	GRID	2	3	2	1	2
1ST-DET. TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	125	130	200	250	160
	SCREEN	75	75	20	60	100
	GRID	5	1	1	2	5
I. F. TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	130	130	200	250	125
	SCREEN	85	75	90	70	110
	GRID	2	4	.2	1	2
2ND-DET. TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	60	95	**	**	170
	SCREEN	—	55	**	**	—
	GRID	9	4	**	**	15
1ST-A. F. TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	130	205	115	110	230
	SCREEN	—	215	—	—	235
	GRID	3	3	2	1	15
2ND-A. F. TUBE	FILAMENT	6	—	2.4	2.4	—
	PLATE	127	—	230	225	—
	SCREEN	130	—	235	230	—
	GRID	12	—	15	15	—
OSC TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	100	85	35	40	75
	GRID	*	*	*	*	*
CONTROL TUBE	FILAMENT	6	2.4	2.4	2.4	2.4
	PLATE	5	40	**	**	14
	GRID	2.5	10	**	**	10

VOLTAGES ACROSS BLEEDER AND BIAS RESISTORS

RESISTOR	188 188-F	260 260-F 1st type	260 260-F 2nd type	469 469-F
Bleeder No. 1	50	92	90	50
Bleeder No. 2	85	108	75	110
Bleeder No. 3	70	73	55	8
Bleeder No. 4	11	20	15	12
Bleeder No. 5	—	88	30	Slight
Bleeder No. 6	—	50	85	35
Bleeder No. 7	—	—	—	55
1st-detector bias	5	2	1	3
R. F.-I. F. bias No. 1	Slight	4	6	1
R. F.-I. F. bias No. 2	7	2	2	—
2nd-I. F. bias	—	Slight	Slight	—
2nd-detector bias	5	—	—	15
1st-A. F. bias	—	5	5	—
A. F. bias	12	15	15	15
Tonebeam adjustment	—	95	120	65

* The measured oscillator grid voltage will vary dependent on several factors. In some cases, no reading will be secured for grid bias. In other cases, the reading will be only slight, or it may be as high as 10 volts.

** In Model 260 and 260-F, the 2nd-detector also functions as automatic-volume-control tube. The voltages that can be read at this socket are as follows: 1st type, cathode to ground 20 volts, grid to ground 7 volts. 2nd type, cathode to ground 15 volts, grid to ground 5 volts.

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